PB82-229766

Thirty-Day Field Tests of Industrial Boilers
Site 6 - Gas-Fired Fire-Tube Boiler

KVB, Inc.
Minneapolis, MN

Prepared for

Industrial Environmental Research Lab.
Research Triangle Park, NC

May 81

U.S. Department of Commerce
National Technical Information Service
NTIS

PB82-229766

United States
Environmental Protection
Agency

Industrial Environmental Research
Laboratory
Research Triangle Park NC 27711

EPA-600/7-81-095b
May 1981

EPA

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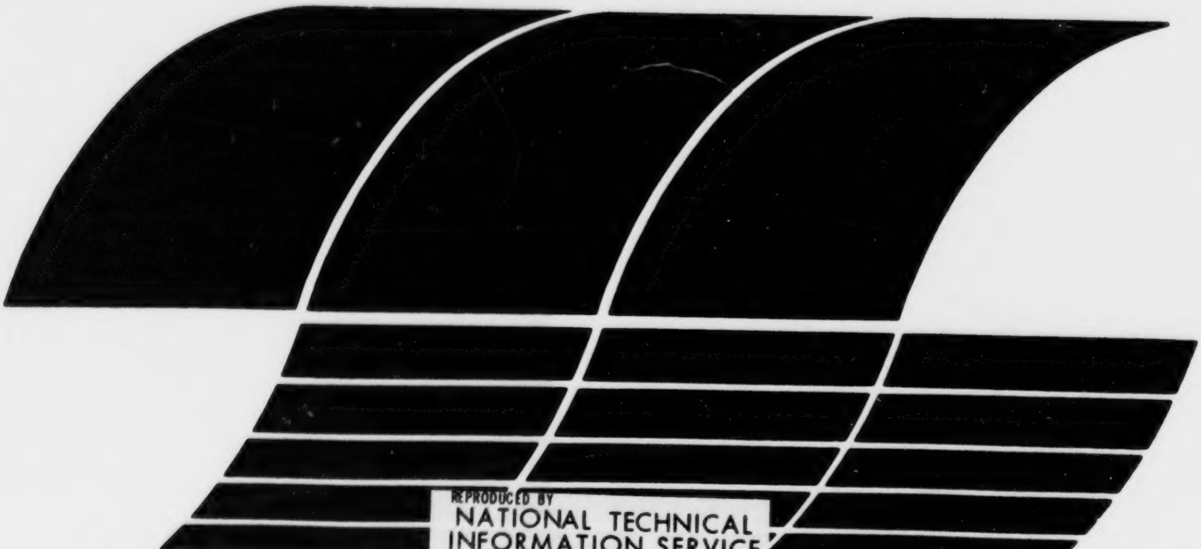
Interagency Energy/Environment R & D Program Report



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TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-600/7-81-095b	2.	3. RECIPIENT'S ACCESSION NO. PB82-229766
4. TITLE AND SUBTITLE Thirty-day Field Tests of Industrial Boilers: Site 6 Gas-fired Fire-tube Boiler		5. REPORT DATE May 1981
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) W.A. Carter and H.J. Buening		8. PERFORMING ORGANIZATION REPORT NO. KVB11-6017-1266
9. PERFORMING ORGANIZATION NAME AND ADDRESS KVB, Inc. P.O. Box 19518 Irvine, California 92714		10. PROGRAM ELEMENT NO. C9BN1B
		11. CONTRACT/GRANT NO. 68-02-2645, Task 4
12. SPONSORING AGENCY NAME AND ADDRESS EPA, Office of Research and Development Industrial Environmental Research Laboratory Research Triangle Park, NC 27711		13. TYPE OF REPORT AND PERIOD COVERED Task Final; 3/79 - 3/80
		14. SPONSORING AGENCY CODE EPA/600/13

15. SUPPLEMENTARY NOTES IERL-RTP project officer is Robert E. Hall, Mail Drop 65, 919/541-2477. EPA-600/7-80-0852 through -085d are similar reports for Sites 1-4; Site 5 is covered by report "a" of this series.

16. ABSTRACT

This is a final report on a test program to evaluate the long-term effectiveness of combustion modifications on industrial boilers. During previous programs, short-term tests were performed on industrial boilers to determine the effect of combustion modifications on air pollutant emissions such as NOx, SOx, CO, HC, and particulates. The objective of this program was to determine if combustion modification techniques which were effective for short-duration tests are feasible for a longer period. The report gives results of a long-duration field test of a 200-hp fire-tube boiler using low excess air as the NOx control technology. The field test was conducted with the unit firing natural gas and with the normal duty cycle. The mean NO level for the 24-day test was 29.5 ng/J with a geometric dispersion of 1.05.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group	
Air Pollution	Carbon Monoxide	Air Pollution Control	13B	07B
Combustion	Hydrocarbons	Stationary Sources	21B	07C
Boilers		Combustion Modification	13A	
Nitrogen Oxides		Industrial Boilers	07A	
Fossil Fuels		Low Excess Air	21D	
Natural Gas				

18. DISTRIBUTION STATEMENT Release to Public	19. SECURITY CLASS *(This Report)* Unclassified	21. NO. OF PAGES 161
	20. SECURITY CLASS *(This page)* Unclassified	22. PRICE

EPA Form 2220-1 (9-73)

EPA-600/7-81-095b
May 1981

Thirty-day Field Tests of Industrial Boilers:
Site 6—Gas-fired Fire-tube Boiler

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Contract No. 68-02-2645
Task No. 4
Program Element No. C9BN1B

EPA Project Officer: Robert E. Hall

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Research Triangle Park, NC 27711

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Research and Development
Washington, DC 20460

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This is a final report on a test program to evaluate the long-term effectiveness of combustion modifications on industrial boilers. During previous programs, short-term tests have been performed on industrial boilers to determine the effect of combustion modifications on air pollutant emissions such as NO_x, SO_x, CO, HC and particulate matter. The objective of this program was to determine whether combustion modification techniques which were effective for short duration tests are feasible for a longer period. This report presents results of a long duration field test of a 200 HP firetube boiler using low excess air as the NO_x control technology. The field test was conducted with the unit firing natural gas and with the normal duty cycle. The mean NO level for the 24-day test period was 29.5 ng/J with a geometric dispersion of 1.05.

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SECTION 1.0

SUMMARY

1.1 OBJECTIVE AND SCOPE

The objective of this field test was to determine whether combustion modification techniques which demonstrated reductions on air pollutant emission during short term tests are feasible for longer periods. In addition, boiler performance and reliability were monitored. The combustion modifications have previously been shown to be effective on industrial boilers (Refs. 1, 2, 3).

The program scope provides for 30-day field tests of a total of seven (7) industrial boilers with design capacities ranging from 14.65 to 73.25 MW output (50,000 to 250,000 lb steam/hr). Fuels to be burned include natural gas, light oil, residual oil, and coal. This final report is for a 200 HP (6,900 lb steam/hr), natural gas fired firetube boiler using low excess air (LEA) as the emission control technology.

During the test period, continuous monitor certification tests were performed concurrent with low NO_x testing. Gaseous emissions measured were: NO, CO, CO_2 and O_2. Particulate matter were not measured at this test site. Boiler efficiency was calculated for several conditions during the program.

This report documents the test equipment and procedures, summarizes the test data and discusses the data in relation to the control technology employed for this boiler.

1.2 RESULTS

A natural gas-fired firetube boiler using low excess air (LEA) as the control technology was selected for this field test. Selection of a firetube boiler for testing was the result of recommendations from the American Boiler Manufacturers Association and the EPA. It was felt that this type of industrial boiler represented a large portion of the boiler population and it was necessary to demonstrate feasibility of long-term implementation of NO_x control on this type equipment.

The boiler selected for testing at Site 6 had previously been tested by KVB under EPA Contract No. 68-02-1074 (Ref. 2). The short duration tests conducted during the previous program had demonstrated a capability of operating under low NO_x conditions. A previous program (Ref. 4) presented a boiler survey and analysis performed to determine the population and distribution of industrial boilers. This study showed that nationally firetube boilers in the 10-16 MBtu/hr category account for 24 percent of the total number of boilers and 8 percent of the total installed capacity.

After selection of the test site a continuous monitor was shipped to the test site and installed. The next task was to perform monitor certification tests as outlined in Performance Specification 2 and 3, 40CFR60, Appendix B (See Appendix D). The monitor certification tests were performed at the initiation of the test period and constituted the first part of the long duration test.

The results of the long duration test are discussed in detail in Section 3.0. A summary of the 24-hour average of gaseous emissions is presented in Table 1-1. This table was compiled from the output of a data logger which records 15-minute averages of gaseous emissions. An analysis of the field test data was also conducted. Figure 1-1 presents a log-probability plot of 24-hour averages of NO emissions. These data show that the mean NO emission rate is 29.5 ng/J with a geometric dispersion of 1.05. This figure also shows that 95 percent of the NO measurements are less than 31.5 ng/J.

1.3 CONCLUSIONS

Based on the results of this long-duration test, several important conclusions can be drawn.

1. Low excess air (LEA) is an effective NO_x control technology for the natural gas fired firetube boiler. The LEA condition was maintained for 24 days with mean NO emission level of 29.5 ng/J (53 ppm @ 3 percent O_2, dry) with a geometric dispersion of 1.05. The low NO_x condition was maintained for the entire test period

TABLE 1-1. SUMMARY OF 24-HOUR AVERAGE GASEOUS EMISSIONS

24 HUUR DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	CO PPMV MEAS	NO PPMV MEAS	CO PPMV 3%O2	NO PPMV 3%O2	CO NG/J	NO NG/J
8/ 5/80		.0	8.3	7.4	20	58	28	82	9	44
8/ 6/80		.0	8.4	7.3	31	57	44	81	14	44
8/ 7/80		.0	6.3	8.4	37	51	45	62	15	33
8/ 8/80		.0	6.2	8.6	81	59	98	71	32	38
8/12/80		.0	8.6	6.5	21	39	30	56	10	30
8/13/80		.0	7.2	7.5	27	40	35	52	11	28
8/14/80		.0	6.4	8.1	28	43	34	52	11	28
8/15/80		.0	6.8	7.8	24	42	30	53	10	28
8/18/80		.0	7.4	7.4	32	39	42	51	13	27
8/19/80		.0	8.1	6.6	30	38	42	53	13	28
8/20/80		.0	7.5	7.3	27	40	36	53	11	29
8/21/80		.0	7.7	7.3	18	41	24	55	8	30
8/22/80		.0	6.9	7.6	26	43	33	55	11	29
8/25/80		.0	7.4	7.2	27	39	35	51	11	28
8/26/80		.0	6.5	8.0	23	43	28	53	9	29
8/27/80		.0	7.6	6.9	35	40	47	53	15	29
8/28/80		.0	5.6	8.8	73	49	85	57	28	31
8/29/80		.0	5.6	8.7	22	50	25	58	8	31
9/ 2/80		.0	9.5	5.7	57	37	89	58	29	31
9/ 3/80		.0	7.6	7.0	107	37	143	49	47	26
9/ 4/80		.0	5.8	8.6	89	46	105	54	34	29
9/ 5/80		.0	5.9	8.6	49	47	58	56	19	30
9/ 8/80		.0	6.2	8.5	99	48	120	58	39	31
9/ 9/80		.0	8.4	6.7	370	42	531	60	175	32
9/10/80		.0	9.7	6.0	197	39	313	62	103	33
9/11/80		.0	8.4	6.9	544	43	781	61	258	33

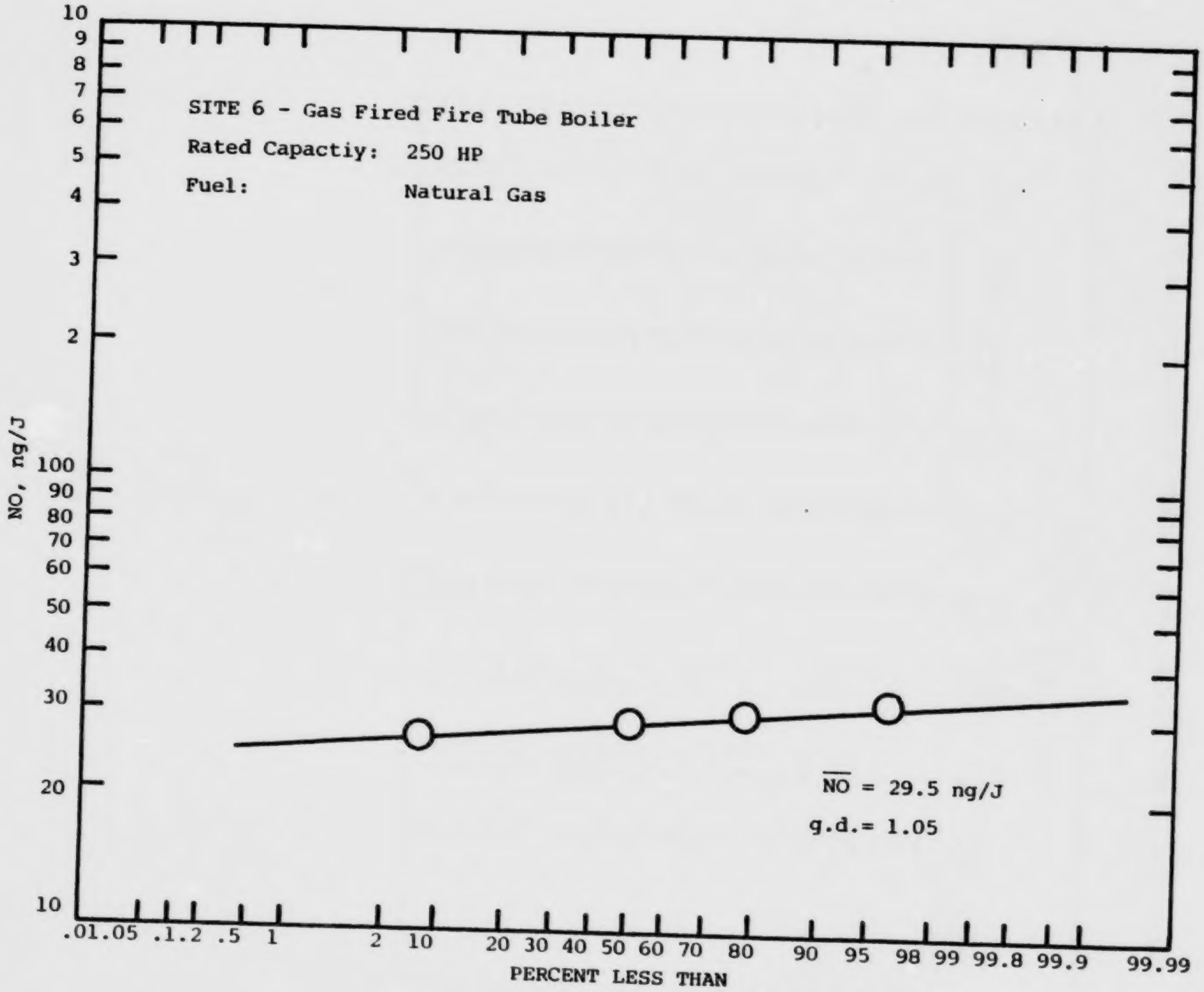


Figure 1-1. Log-Probability plot of NO Emissions from a firetube boiler.

despite the extreme cyclic nature of the boiler operation. The boiler often cycled from high fire to low fire conditions in less than 15 minutes.

2. Boiler operation in the low NO_x mode presented no reliability or functional problems. The LEA mode can be maintained for extended periods providing adequate instrumentation and display are provided. An indoctrination and training period for operators is recommended.

3. The continuous monitor system utilizing an extractive sampling system provided accurately reliable data for the entire test period. Calibration of the instruments on a daily basis is necessary as is maintenance of the sample system.

4. The cyclic operation of this boiler is typical of a large number of industrial boilers. An effective control technology must be capable of operation over large load changes.

SECTION 2.0

INSTRUMENTATION AND PROCEDURES

This section presents a description of the instrumentation used to measure the gaseous emissions, the test procedures, and techniques for certifying the continuous monitor and a description of the boiler tested.

2.1 EMISSIONS MEASUREMENT INSTRUMENTATION

The emissions measurements were made using a continuous monitor fabricated by KVB for this program. The analytical instrumentation and sample handling equipment are contained in a cabinet 1.2 m wide x 0.76 m deep x 1.83 m high (48"W x 30"D x 72"H). A photograph of the continuous monitor is shown in Figure 2-1. Gaseous emission measurements were made with the analytical instruments listed in Table 2-1.

2.1.1 Gaseous Emissions

The continuous monitor is equipped with analytical instruments to measure concentrations of NO, CO, CO_2, and O_2. The sample gas is delivered to the analyzers at the proper condition and flow rate through the sampling and conditioning system shown schematically in Figure 2-2. A probe with a 0.7 micrometer sintered stainless steel filter was installed in the stack to sample the flue gas. The following paragraphs describe the analytical instrumentation.

A. Nitrogen Oxides--

The oxides of nitrogen monitoring instrument was a Thermo Electron chemiluminescent nitric oxide analyzer. The operational basis of the instrument is the chemiluminescent reaction of NO and O_3 to form NO_2 in an excited state. Light emission results when excited NO_2 molecules revert to their ground state. The resulting chemiluminescence is monitored through an optical filter by a high sensitivity photomultiplier tube, the output of which

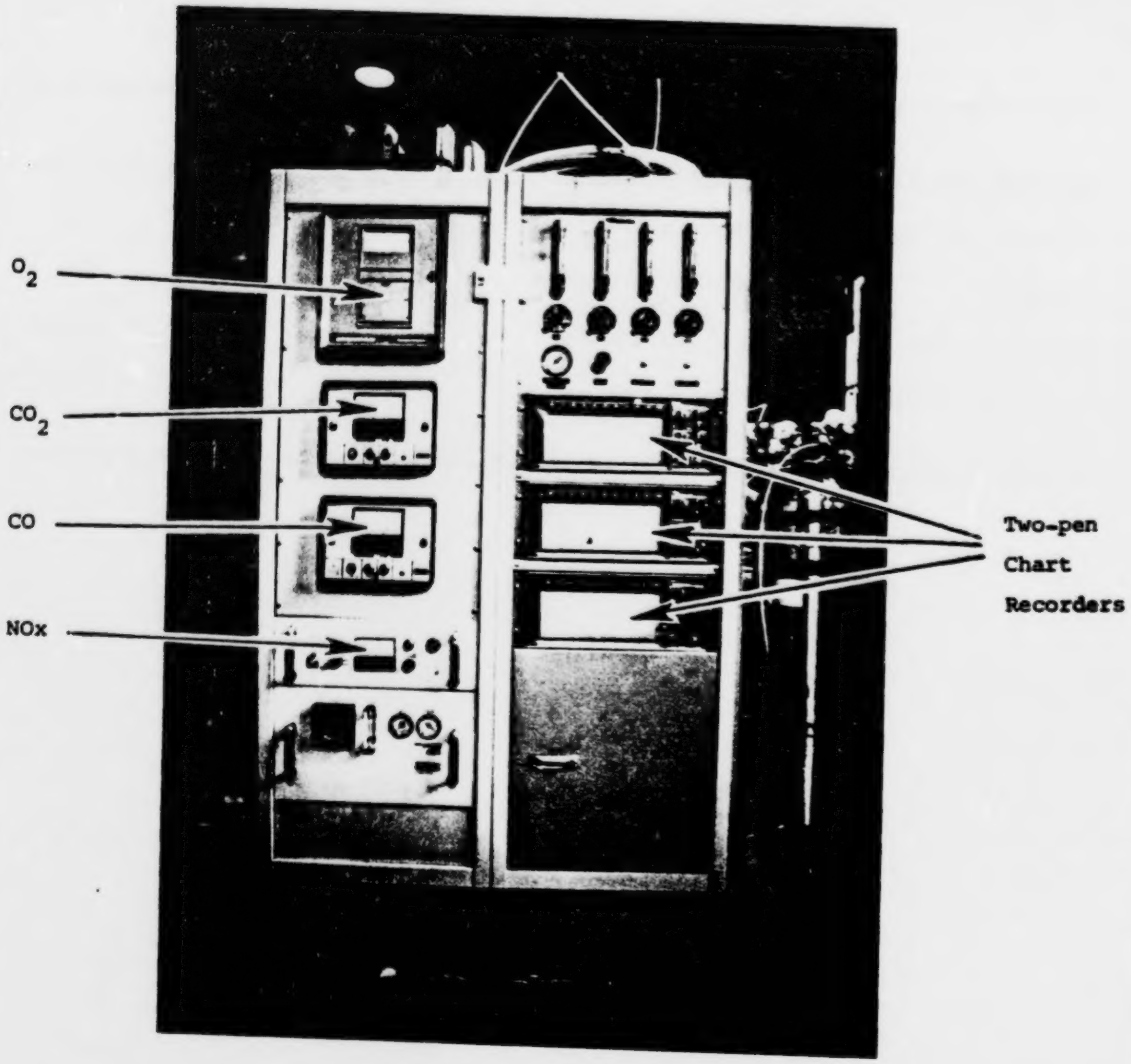
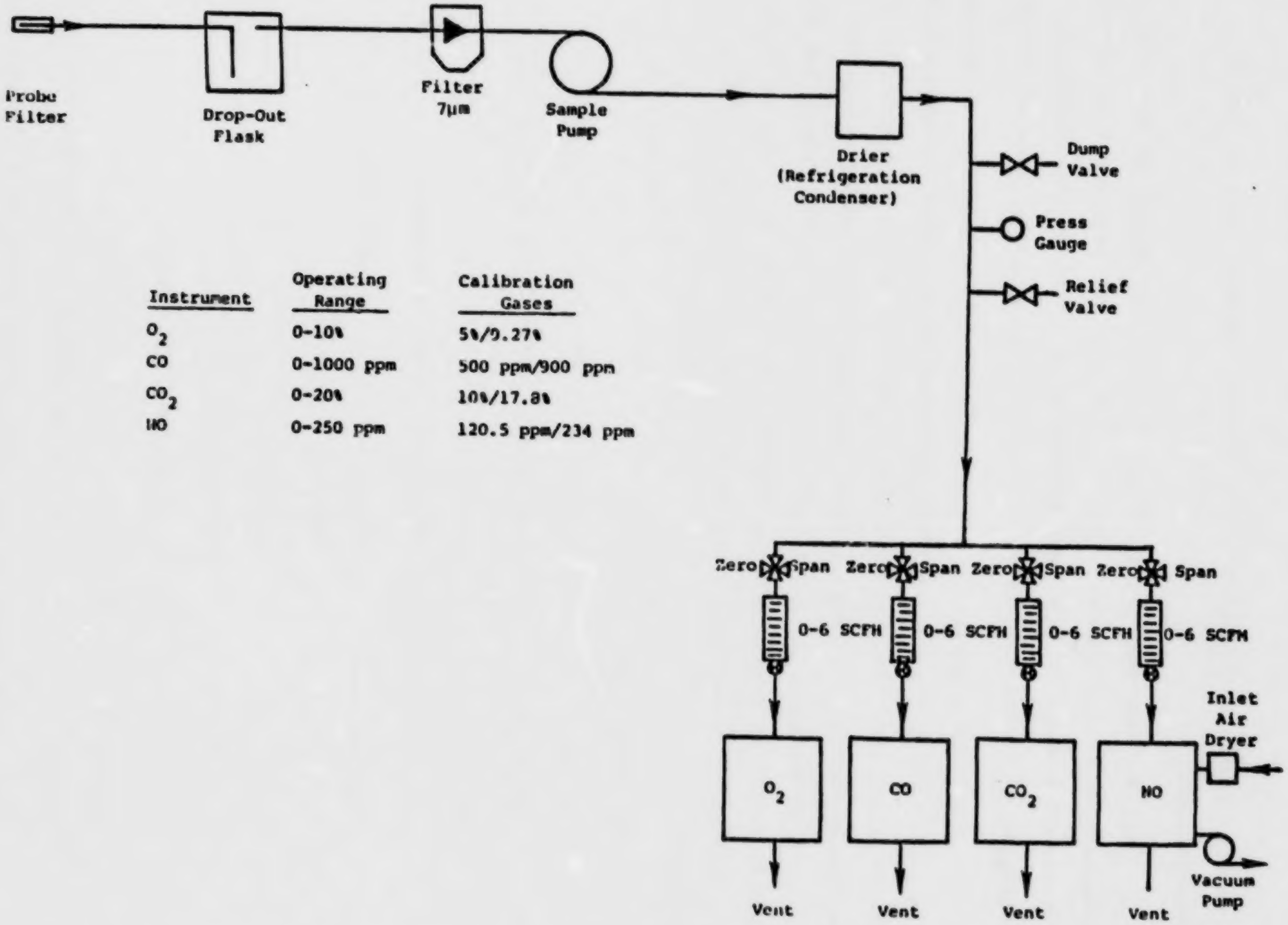

O_2
CO_2
CO
NOx
Two-pen
Chart
Recorders

Figure 2-1. Photograph of KVB continuous monitor for measuring gaseous emissions.

TABLE 2-1. ANALYTICAL INSTRUMENTATION

Emission Species	Manufacturer	Measurement Method	Model No.
Nitrogen Oxides	Thermo Electron	Chemiluminescent	10A
Oxygen	Beckman Instrument	Polarographic	742
Carbon Dioxide	Horiba Instrument	NDIR	PIR-2000
Carbon Monoxide	Horiba Instrument	NDIR	PIR-2000


Probe Filter
Drop-Out Flask
Filter 7μm
Sample Pump
Drier (Refrigeration Condenser)
Dump Valve
Press Gauge
Relief Valve
Zero
Span
Zero
Span
Zero
Span
Zero
Span
0-6 SCFH
0-6 SCFH
0-6 SCFH
0-6 SCFH
Inlet Air Dryer
O2
CO
CO2
NO
Vent
Vent
Vent
Vent
Vacuum Pump

Instrument	Operating Range	Calibration Gases
O_2	0-10%	5%/9.27%
CO	0-1000 ppm	500 ppm/900 ppm
CO_2	0-20%	10%/17.8%
NO	0-250 ppm	120.5 ppm/234 ppm

Figure 2-2. Schematic of continuous monitor sampling and conditioning system.

is electronically processed so it is linearly proportional to the NO concentration.

Air for the ozonator is drawn from ambient through an air dryer and a 10-micrometer filter element. Flow control for the instrument is accomplished by means of a small bellows pump mounted on the vent of the instrument downstream of a separator which insures that no water collects in the pump.

The basic analyzer is sensitive only to NO molecules. To measure NO_x (i.e., NO + NO_2), the NO_2 is first converted to NO. This is accomplished by a converter which is included with the analyzer. The conversion occurs as the gas passes through a thermally insulated, resistance heated, stainless steel coil. With the application of heat, NO_2 molecules in the sample gas are reduced to NO molecules, and the analyzer then reads NO_x. NO_2 is obtained by the difference in readings obtained with and without the converter in operation.

Specifications

Accuracy:	1% of full scale
Span drift:	± 1% of full scale in 24 hours
Zero drift:	± 1 ppm in 24 hours
Power requirements:	115 ± 10V, 60 Hz, 1000 watts
Response:	90% of F.S. in 1 sec (NO_x mode); 0.7 sec (NO mode)
Output:	4-20 ma
Sensitivity:	0.5 ppm
Linearity:	± 1% of full scale
Vacuum detector operation	
Range:	2.5, 10 25, 100, 250, 1000, 2500, 10,000 ppm F.S.

Only the NO concentration was measured during this program. Because of the added complexity of heated sample lines and controllers necessary for measuring NO_2 and the small percentage of NO_2 in the flue gas, based on previous tests (Ref. 1, 2 and 3) EPA decided that only NO measurement was necessary. Therefore, an unheated sample line was installed and the moisture was removed from the sample gas by a drop out flask and a refrigerated condenser.

B. Carbon Monoxide and Carbon Dioxide--

Carbon monoxide (CO) and carbon dioxide (CO_2) concentrations were measured by Horiba Instruments PIR-2000 short path length nondispersive infrared analyzers. These instruments measure the differential in infrared energy absorbed from energy beams passed through a reference cell (containing a gas selected to have minimal absorption of infrared energy in the wave length absorbed by the gas component of interest) and a sample cell through which the sample gas flows continuously. The differential absorption appears as a reading on a scale of zero to 100 percent and is then related to the concentration of the species of interest by calibration curves supplied with the instrument. A linearizer was supplied with the CO analyzer to provide a linear output over the range of interest. The operating ranges for the CO analyzer are zero to 500, zero to 1000, and zero to 2000 ppm, and the ranges for the CO_2 analyzer are zero to 5, zero to 10, and zero to 20 percent.

Specifications

Accuracy:	1% of full scale
Repeatability:	± 0.5% of full scale
Zero drift:	± 1% of full scale in 24 hours
Span drift:	± 1% of full scale in 24 hours
Response time:	selectable - 90% of full scale in 0.5, 1.2, 3, or 5 seconds
Power requirements:	115 VAC ± 10%, 60 Hz
Warm up time:	30 minutes
Output:	0-10 MV

C. Oxygen--

A Beckman Model 742 oxygen analyzer was used to continuously determine the oxygen content of the flue gas sample. The oxygen measuring element contains a silver anode and gold cathode that are protected from the sample by a thin membrane of Teflon. An aqueous KCL solution is retained in the sensor by the membrane and serves as an electrolytic agent. As Teflon is permeable to gases, oxygen will diffuse from the sample to the cathode in the following oxidation-reduction reaction:

Cathode reaction: $O_2 + 2H_2O + 4e \quad 4OH$

Anode reaction: $4Ag + 4Cl \rightarrow 4AgCl + 4e$

With an applied potential between the cathode and anode, oxygen will be reduced at the cathode causing a current to flow. The magnitude of this current is proportional to the partial pressure of oxygen present in the sample. The instrument has operating ranges of zero to 1 percent, zero to 10 percent, and zero to 25 percent oxygen.

Specifications

Accuracy:	± 1% full scale or ± 0.05% O_2 whichever is greater
Sensor stability:	± 1% of full scale per 24 hours
Response time:	90% in 20 seconds
Output:	0-10 MV
Power requirement:	120 ± 10 VAC, 60 Hz

2.2 BOILER DESCRIPTION AND CHARACTERISTICS

The boiler at Site 6 was manufactured by Kewanee Division of American Standard. The nameplate rating of the unit is 200 HP (6695 MBH, 2.0 MW_T). The boiler is of the scotch-type design wherein the combustion takes place in a cylindrical furnace within the shell. Firetubes run the length of the shell at the sides of and above the internal furnace. Gas from the furnace reverses direction in a chamber at the rear and travels forward through the tubes to the smokebox.

The firetube boiler at location 6 is a dryback 3-pass design, with a refractory-lined rear chamber.

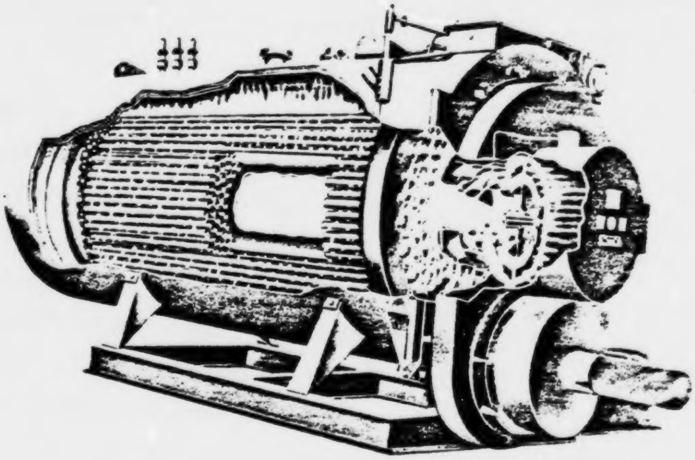


Figure 2-3. Firetube Boiler (Typical)

Figure 2-3 shows the typical arrangement of a scotch-type firetube boiler. The tested unit was self-contained with a forced draft system that supplied combustion air at the required pressure to the burner. In the burners chamber the fresh boiler room air was directed through a diffuser plate and then mixes with the fuel. Metering of fuel and air was automatic and changed with load demand. The unit was equipped with a combination oil and gas burner. During the test program only natural gas was burned in a ring burner. Maximum working pressure for steam is 15 lb and for water is 30 lb. The maximum firing range was 8370 MBtu.

The unit was installed in a large photo developing laboratory and was used to generate hot water for film processing during the hours of 5 a.m. and approximately 9 p.m. on workdays.

The boiler was off line from approximately 11:00 p.m. until 5:00 a.m. each day. The operation of the unit was very cyclic, with occasional firing from high to low within 15 minutes.

2.3 DAILY TEST ACTIVITY

This section describes the daily test activity at Site 6 following the monitor certification tests. The schedule of monitor certification test events is presented in Section 3.1. A schedule of daily events is presented in Table 2-2.

The data from the gaseous analyzers (NO, CO, CO_2, and O_2) were continuously recorded on strip chart recorders and an automatic data logger. Gaseous data were read five times daily by a technician and recorded on the form shown in Figure B-2, Appendix B. Boiler control room data were recorded five times daily by the KVB technician. The gaseous emissions data were recorded only during an eight hour shift, but the strip chart recorders and data logger recorded the data 24 hours per day 7 days per week. No control room data were recorded during the week-ends, however, the technician did calibrate the instruments during the week-end.

Daily tasks consisted of 1) calibration and recording data, 2) consultation with operators to assure operation in the low NO_x mode, 3) periodic maintenance of instruments and sample system, 4) visual inspection and trouble shooting of sampling system and instrumentation console, and 5) procuring supplies and equipment for the particulate and Method 7 tests.

TABLE 2-2. SCHEDULE OF DAILY EVENTS - SITE 6

Time	Event
0800	Calibrate (zero and span) gaseous analyzers (NO, CO_2, CO, and O_2). Record gaseous emissions data. Record boiler control room data. Consult with operators concerning boiler operation.
0900	Perform daily systems checkout.
1000	Calibrate and record gaseous emissions data.
1200	Calibrate and record gaseous emissions data. Record control room data.
1400	Calibrate and record gaseous emissions data.
1600	Calibrate and record gaseous emissions data. Record control room data.
1700	Calibrate analyzers prior to departing plant. Perform visual check of sampling systems and boiler operation. Leave instructions with operators.

SECTION 3.0

TEST RESULTS

This section summarizes the emission and efficiency data collected on the natural gas fired firetube boiler. The boiler was tested in the as-found condition initially and for 26 days in the low NO_x condition. The tests were conducted with Southern California natural gas as the fuel. The results presented herein summarize the gaseous emissions data, efficiency, and conclusions for the boiler operating under low NO_x conditions for extended duration.

3.1 CONTINUOUS MONITOR CERTIFICATION TESTS

The continuous monitor described in the previous section was used to measure the boiler gaseous emissions. Following shipment to the test site, the monitoring system was installed and certification tests performed in accordance with Performance Specification 2 (PS2) and 3 (PS3), 40 CFR 60, Appendix B (see Appendix D). These establish minimum performance specifications that the NO and O_2/CO_2 monitoring system must meet in terms of eight parameters: accuracy, calibration error, two and 24 hour zero drifts, two and 24 hour calibration drifts, response time, and operational period.

The continuous monitor system was installed and instruments were initially calibrated on August 4, 1980. The following day the monitor performance certification began. A daily event schedule for the certification tests is presented in Table 3-1.

The performance of the continuous monitor is summarized in Table 3-2. Also shown in the table are the monitor specifications extracted from PS2 and PS3. Included in this table is the performance of the CO analyzer which is not covered by the performance specification. The CO analyzer is used to monitor the combustion conditions in the boiler since it is a very sensitive indicator of combustion performance. Tables C-1 through

TABLE 3-1. SCHEDULE OF CERTIFICATION TEST EVENTS

Date	Time	Event
8-4-80	10:00	Calibration error determination
8-4-80	14:00	Response time determination
8-5-80	8:30	Initial 24 hour zero and span reading Initial 2 hour zero and span reading
8-5-80	10:30	1st 2 hour zero and span drift point
8-5-80	12:30	2nd 2 hour zero and span drift point
8-5-80	14:30	3rd 2 hour zero and span drift point
8-6-80	8:30	1st 24 hour zero and calibration drift point Initial 2 hour zero and calibration reading
8-6-80	10:30	4th 2 hour zero and span drift point
8-6-80	12:30	5th 2 hour zero and span drift point
8-6-80	14:30	6th 2 hour zero and span drift point
8-6-80	16:30	7th 2 hour zero and span drift point
8-7-80	8:30	2nd 24 hour zero and calibration drift point Initial 2 hour zero and calibration reading
8-7-80	8:55	1st set of relative accuracy samples taken
8-7-80	9:55	2nd set of relative accuracy samples taken
8-7-80	10:30	8th 2 hour zero and span drift point
8-7-80	10:55	3rd set of relative accuracy samples taken
8-7-80	11:55	4th set of relative accuracy samples taken
8-7-80	12:30	9th 2 hour zero and span drift point
8-7-80	12:55	5th set of relative accuracy samples taken
8-7-80	13:55	6th set of relative accuracy samples taken
8-7-80	14:30	10th 2 hour zero and span drift point
8-7-80	14:55	7th set of relative accuracy samples taken
8-7-80	15:55	8th set of relative accuracy samples taken
8-7-80	16:30	11th 2 hour zero and span drift point
8-7-80	16:55	9th set of relative accuracy samples taken
8-8-80	8:30	3rd 24 hour zero and calibration drift point Initial 2 hour zero and calibration reading
8-8-80	10:30	12th 2 hour zero and span drift point
8-8-80	12:30	13th 2 hour zero and span drift point
8-8-80	14:30	14th 2 hour zero and span drift point
8-11-80	8:30	Initial 24 hour zero and span reading
8-12-80	8:30	4th 24 hour zero and calibration drift point
8-13-80	8:30	5th 24 hour zero and calibration drift point
8-14-80	8:30	6th 24 hour zero and calibration drift point
8-15-80	8:30	7th and final 24 hour zero and calibration drift point
9-11-80	8:30	1st set of relative accuracy samples taken
9-11-80	9:30	2nd set of relative accuracy samples taken
9-11-80	10:30	3rd set of relative accuracy samples taken
9-11-80	11:30	4th set of relative accuracy samples taken
9-11-80	12:30	5th set of relative accuracy samples taken
9-11-80	13:30	6th set of relative accuracy samples taken
9-11-80	14:30	7th set of relative accuracy samples taken
9-11-80	15:30	8th set of relative accuracy samples taken
9-11-80	16:30	9th set of relative accuracy samples taken

TABLE 3-2. INSTRUMENT SPECIFICATIONS AND PERFORMANCE

Parameter	Specifications	Performance
A. Thermo Electron Series 10 NO_x Analyzer		
1. Accuracy	$\leq$ 20% of mean ref. value	18.4%
2. Calibration error mid	$\leq$ 5% cal gas value	0.9%
high	$\leq$ 5% of cal gas value	0.55%
3. Zero drift (2 hour)	2% of span	1.13%
4. Zero drift (24 hour)	2% of span	1.5%
5. Calibration drift (2 hour)	2% of span	0.258%
6. Calibration drift (24 hour)	2.5% of span	1.6%
7. Response time	15 minute maximum	29 sec
8. Operational period	168 hour minimum	624 hr
B. Horiba Instruments PIR 2000 CO_2 Analyzer		
1. Zero drift (2 hour)	$\leq$ 0.4 pct CO_2	0.29%
2. Zero drift (24 hour)	$\leq$ 0.5 pct CO_2	0%
3. Calibration drift (2 hour)	$\leq$ 0.4 pct CO_2	0.29%
4. Calibration drift (24 hour)	$\leq$ 0.5 pct CO_2	0.08%
5. Response time	10 minutes	52 sec
6. Operational period	168 hour minimum	624 hr
C. Beckman Instruments Model 742 O_2 Analyzer		
1. Zero drift (2 hour)	$\leq$ 0.4 pct O_2	DNA*
2. Zero drift (24 hour)	$\leq$ 0.5 pct O_2	DNA*
3. Calibration drift (2 hour)	$\leq$ 0.4 pct O_2	0.02%
4. Calibration drift (24 hour)	$\leq$ 0.5 pct O_2	0.06%
5. Response time	10 minutes	27 sec
6. Operational period	168 hour minimum	624 hr
D. Horiba Instruments PIR 2000 CO Analyzer		
1. Calibration error	$\leq$ 5% of cal gas value	1.6%
high	$\leq$ 5% of cal gas value	0%
2. Zero drift (2 hour)	2% of span	0.87%
3. Zero drift (24 hour)	2% of span	1.92%
4. Calibration drift (2 hour)	2% of span	0.17%
5. Calibration drift (24 hour)	2.5% of span	1.97%
6. Response time	15 minute maximum	41 sec
7. Operational period	168 hour minimum	624 hr

*Instrument has no zero adjustment

C-18, Appendix C, show the performance of each of the analyzers for the certification tests.

The data presented in Table 3-2 show analyzers in the continuous monitor bettered the performance specification values for each parameter for each instrument.

Certified calibration gases were obtained from Scott Environmental Technology Inc. The calibration gases included 50 percent and 90 percent span gases for the NO, CO_2, CO, and O_2 analyzers, and a zero gas. In addition to the certified analysis supplied by the vendor, sample flasks were taken for each calibration gas and sent to an independent laboratory for analysis.

Relative accuracy tests for the NO analyzer were performed as outlined in PS2 using EPA Reference Method 7 (phenoldisulfonic acid [PSD] colorimetric) as the standard. Nine sets of three PDS flasks were collected at one hour intervals at the beginning and end of the long duration test period. All sample flasks were returned to an independent laboratory for analysis. The results of the relative accuracy determination are shown in Tables C-17 and C-18 for the start and end of the test. Both tests showed that the NO instrument exceeded the accuracy requirements of PS2. The relative accuracy of the Thermo Electron NO analyzer was about 18.7 percent based on the first test series and about 18.2 percent based on the final test series. The relative accuracy requirement published in PS2 is $\leq$ 20 percent of mean reference value.

3.2 FIRETUBE BOILER TESTS

The continuous monitor system was installed by KVB personnel on August 4, 1980. A single unheated sample line was strung from the boiler stack to the continuous monitor. A single stainless steel probe with a sintered steel filter was installed in the center of the stack. Since only natural gas was fired, no particulate measurements were made.

The boiler was initially tested in the "as found" condition on August 5, 1980. The boiler was operating at a daily average of 2.1 x 10^6 Btu/hr thermal input. The NO emission rate measured at this condition was 44 ng/J (82 ppm @ 3% O_2, dry).

After measuring the emissions with the boiler in the "as found" condition the burner air registers were adjusted to lower the excess oxygen. This condition was then maintained for the remainder of the test period.

The operation of the boiler was very cyclic. The boiler cycled from high fire to low fire conditions several times per hour depending on demand. The operation of the boiler is illustrated in Figure 3-1 which is a strip chart recording of the NO and O_2 analyzers for one day. Prior to 0500 the boiler demand is off with only an occasional firing to keep the boiler warm. After 0500 the demand requires that the boiler cycle more frequently. In the early hours the firing rate is higher and the O_2 level is lower. In the later hours, the average load is lower with a correspondingly higher O_2 level. On occasion, high CO values were measured during high O_2 operation. These high O_2 values were encountered during low load demand and heavy unit cycling at low load cycles. The unit usually was restarted repeatedly during the 15-minute measured intervals. While restarting, the forced draft air fan damper opens all the way to purge the boiler from unburned gas fuel. Then gas fuel is injected through the nozzles in the ring burner and a moment later ignition takes place. During this purge and ignition cycle, high CO values in conjunction with high O_2 values are observed. The average daily load is shown in Figure 3-2 where thermal input as a function of days from start of test is shown. Thermal input was calculated from gas flow meter readings made during the day by the KVB technician and the heat content of the gas obtained from the local gas company.

A plot of the daily 24-hour average of NO emission is shown in Figure 3-3 for the test period. These data are taken from the tabulated data presented in Table 3-3.

The gaseous emissions data measured by the analyzers were recorded on strip chart recorders and an automatic data logger. Strip chart records were cross checked with the data logger record to detect any data gaps or

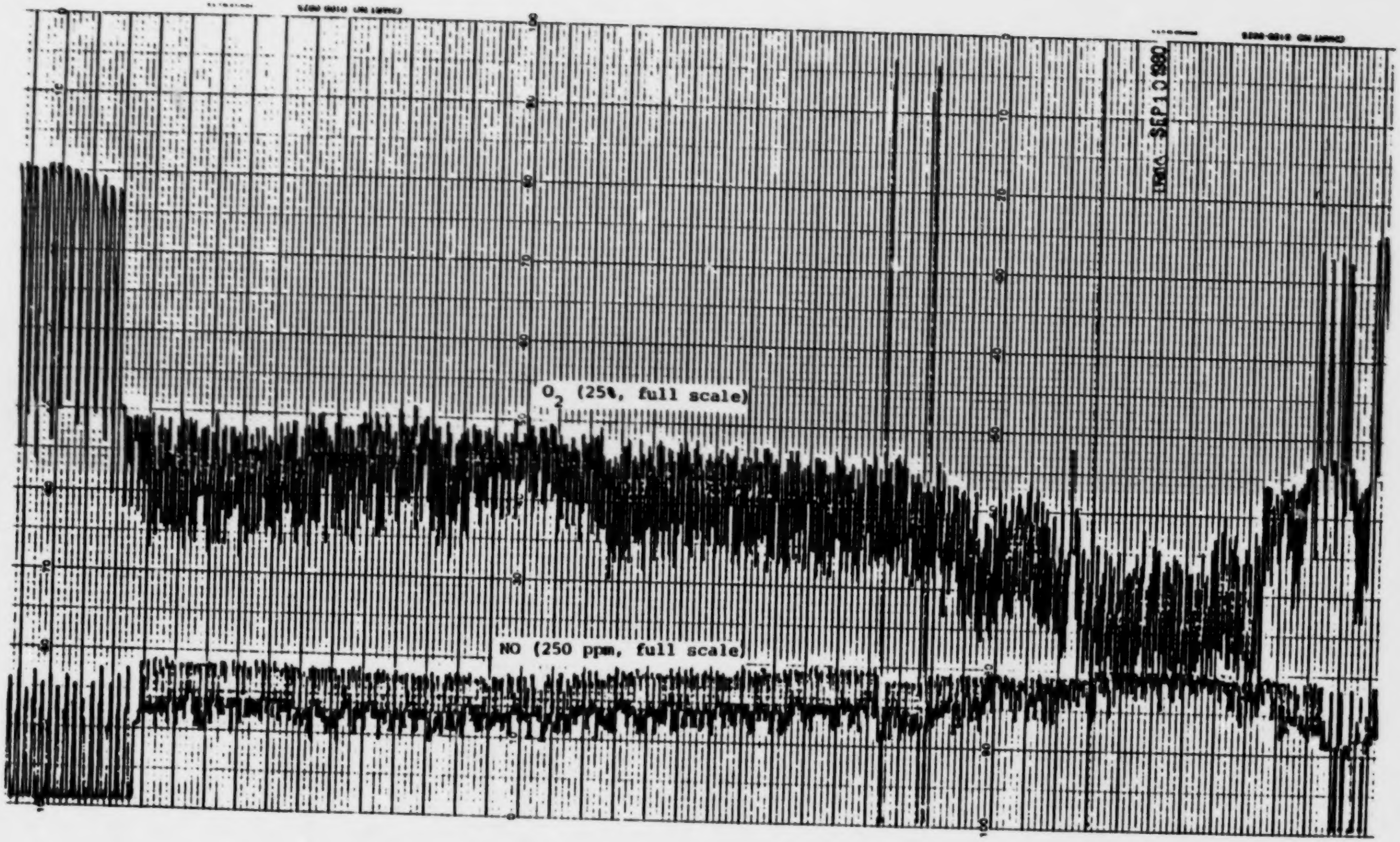


Figure 3-1. Strip chart record of NO and O_2 analyzer output

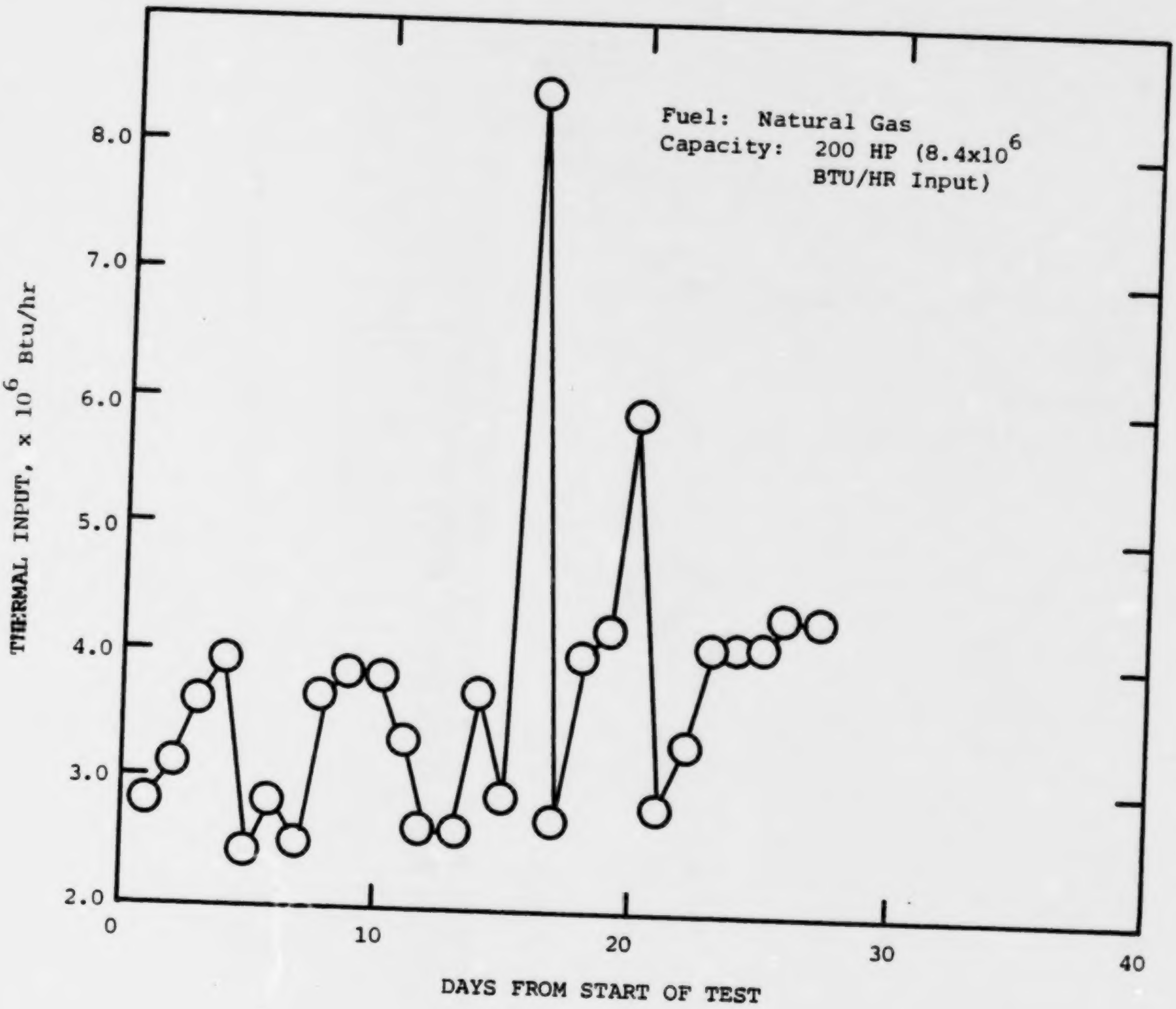


Figure 3-2. Average Daily Thermal Input for Site 6.

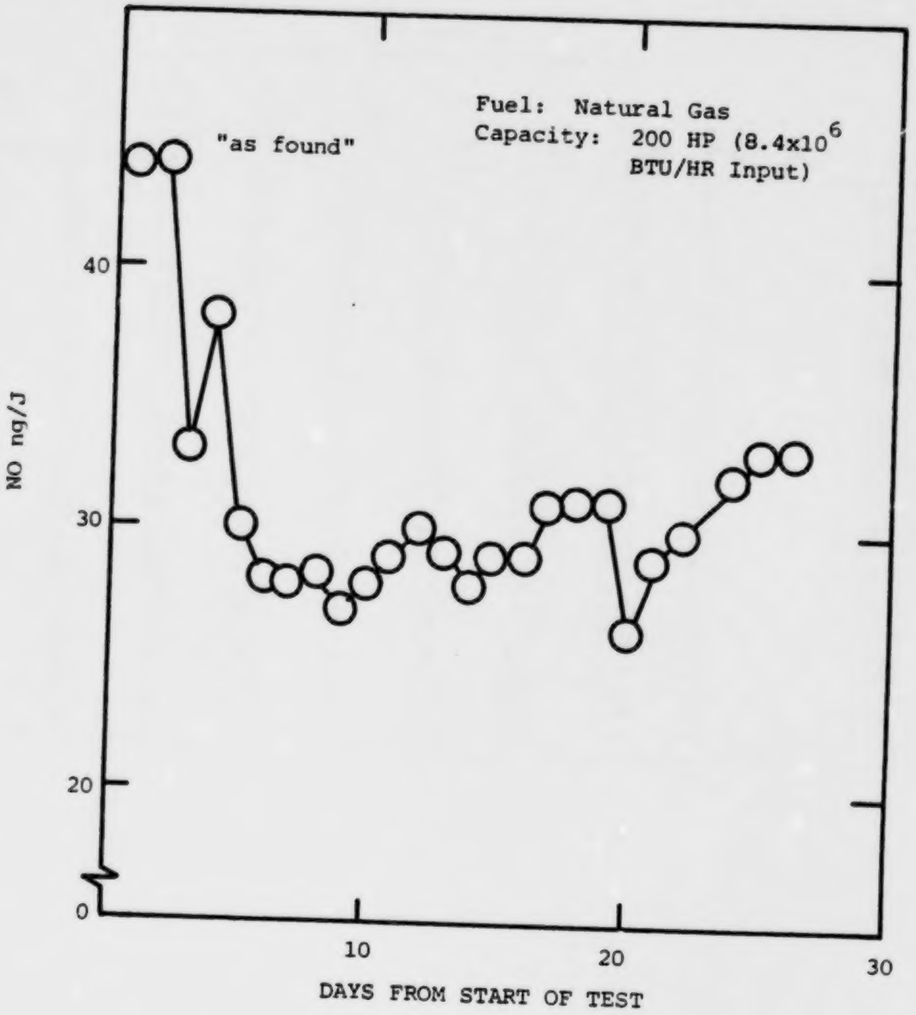


Figure 3-3. Average Daily NO Emissions for Site 6.

TABLE 3-3.

```
**************************************************************************************************
**                                                                                              
**                                      24 HUUR DATA                                            
**                          DRY STACK GAS CONCENTRATION                                       **
**                                                                                            **
**                              O2      CO2      CO       NO       CO       NO                **
**                    LOAD     VOL%     VOL%    PPMV     PPMV     PPMV     PPMV     CO     NO  **
**   DATE     TIME    MWTH     MEAS     MEAS    MEAS     MEAS     3%O2     3%O2    NG/J   NG/J **
***********************************************************************************************
** 8/ 5/80              .0      8.3      7.4      20       58       28       82       9     44  **
** 8/ 6/80              .0      8.4      7.3      31       57       44       81      14     44  **
** 8/ 7/80              .0      6.3      8.4      37       51       45       62      15     33  **
** 8/ 8/80              .0      6.2      8.6      81       59       98       71      32     38  **
** 8/12/80              .0      8.6      6.5      21       39       30       56      10     30  **
** 8/13/80              .0      7.2      7.5      27       40       35       52      11     28  **
** 8/14/80              .0      6.4      8.1      28       43       34       52      11     28  **
** 8/15/80              .0      6.8      7.8      24       42       30       53      10     28  **
** 8/18/80              .0      7.4      7.4      32       39       42       51      13     27  **
** 8/19/80              .0      8.1      6.6      30       38       42       53      13     28  **
** 8/20/80              .0      7.5      7.3      27       40       36       53      11     29  **
** 8/21/80              .0      7.7      7.3      18       41       24       55       8     30  **
** 8/22/80              .0      6.9      7.6      26       43       33       55      11     29  **
** 8/25/80              .0      7.4      7.2      27       39       35       51      11     28  **
** 8/26/80              .0      6.5      8.0      23       43       28       53       9     29  **
** 8/27/80              .0      7.6      6.9      35       40       47       53      15     29  **
** 8/28/80              .0      5.6      8.8      73       49       85       57      28     31  **
** 8/29/80              .0      5.6      8.7      22       50       25       58       8     31  **
** 9/ 2/80              .0      9.5      5.7      57       37       89       58      29     31  **
** 9/ 3/80              .0      7.6      7.0     107       37      143       49      47     26  **
** 9/ 4/80              .0      5.8      8.6      89       46      105       54      34     29  **
** 9/ 5/80              .0      5.9      8.6      49       47       58       56      19     30  **
** 9/ 8/80              .0      6.2      8.5      99       48      120       58      39     31  **
** 9/ 9/80              .0      8.4      6.7     370       42      531       60     175     32  **
** 9/10/80              .0      9.7      6.0     197       39      313       62     103     33  **
** 9/11/80              .0      8.4      6.9     544       43      781       61     258     33  **
**************************************************************************************************
```

anomalies. In addition, the records were verified by comparison with hourly measurements recorded by a technician. A tabulation of hourly averages was compiled for the entire test period. After the data were compiled, they were spot checked and edited to detect obvious errors. The data were then keypunched on cards for input to the computer. Twenty-four-hour averages were then calculated from the hourly data. Table 3-3 presents a list of 24-hour averages compiled from the 15-minute averages for the entire test period.

Emission factors for the gas-fired boiler were calculated using the procedure set forth in 40 CFR 60, Subpart D. The NO emission factor (dry basis) was calculated using the following equation:

$$E = C_d F_d \frac{20.9}{20.9 - \%\ O_{2_d}}$$

Where E = Pollutant emission rate, ng/J (lb/million Btu)

C_d = NO concentration, ng/scm (lb/scf)

F_d = Stoichiometric conversion factor, 2.43×10^{-7} dscm/J (8.710 dscf/million Btu), for natural gas

O_{2_d} = Oxygen concentration, percent by volume, dry

The conversion of ppm (NO_2) to ng/scm is made by multiplying by 1.912×10^6. To convert from ppm/NO_2 to lb/scf, multiply by 1.19×10^{-7}. No emissions are measured as NO dry and reported as NO_2.

Statistical analysis of the data was performed to determine the distribution which best characterized the data. Figure 3-4 presents the log of NO emission rate plotted vs. probability. The data result in a straight line, indicating that the data are log-normally distributed. The data show that the mean NO emission rate is 29.5 ng/J with a geometric dispersion of 1.05. For these data 99 percent of the values fall below 33 ng/J. These data do not include the measurements taken with the boiler in the "as found" condition or the data taken on August 8, 1980 when the monitor cabinet cooling system was inoperative and excessive cabinet temperatures resulted in anomalous data. The cabinet cooling system was subsequently repaired and remained in operation for the remainder of the test.

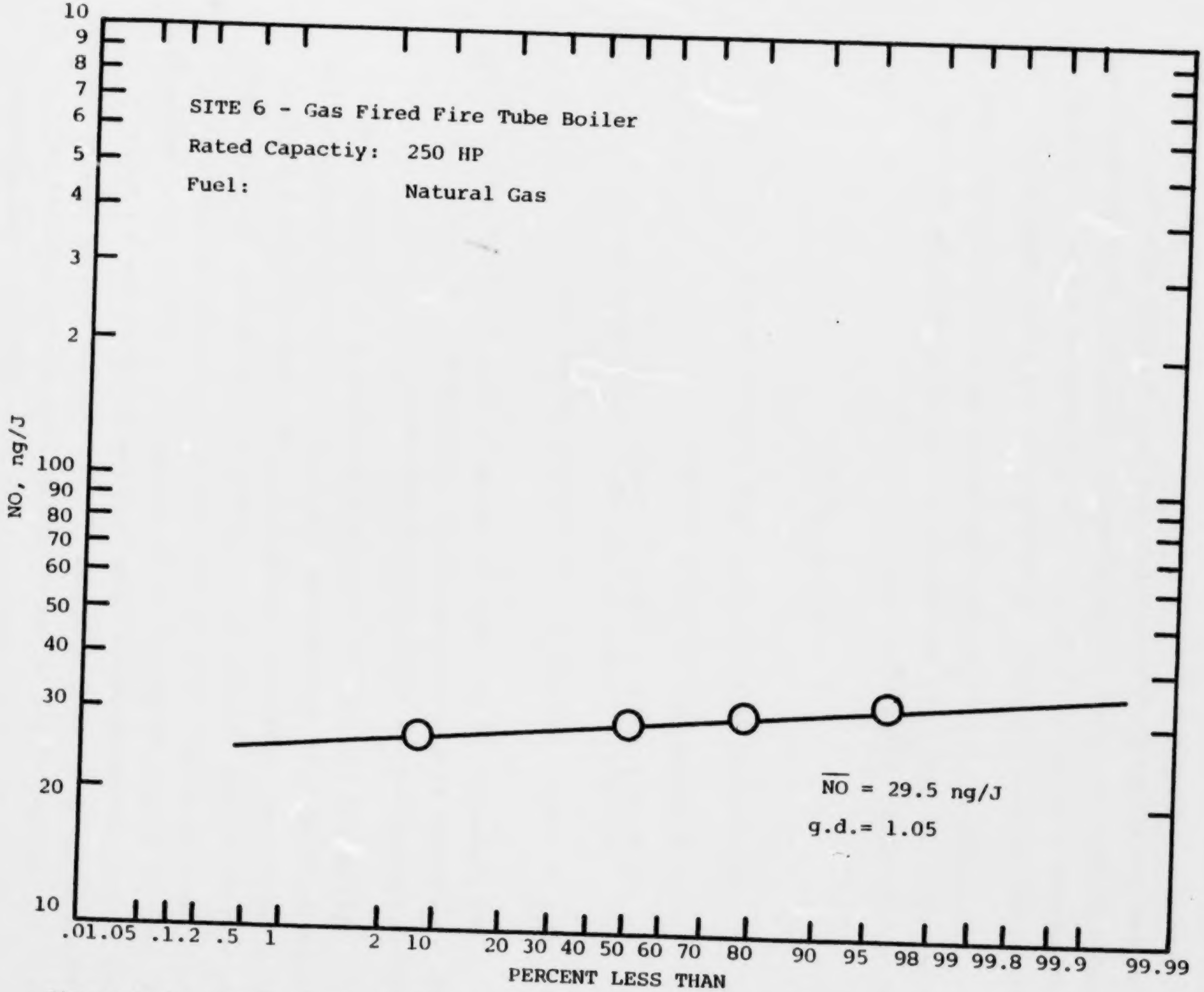


Figure 3-4. Log-Probability plot of NO Emissions from a fire tube boiler.

TA,

SECTION 4.0

REFERENCES

1. Maloney, K. L. et al., "Systems Evaluation of the Use of Low-Sulfur Western Coal in Existing Small and Intermediate-Sized Boilers," EPA Contract No. 68-02-1863, EPA 600/7-78-153a.

2. Cato, G. A. et al., "Field Testing: Application of Combustion Modifications to Control Pollutant Emissions from Industrial Boilers - Phase I," EPA 650/2-74-078a, NTIS No. PB 238 920, June 1975.

3. Cato, G. A. et al., "Field Testing: Application of Combustion Modifications to Control Emissions from Industrial Boilers - Phase II," EPA 600/2-76-086a, NTIS No. PB 253 500, April 1976.

4. "Assessment of the Potential for Energy Conservation Through Improved Industrial Boiler Efficiency," KVB 8300-452.

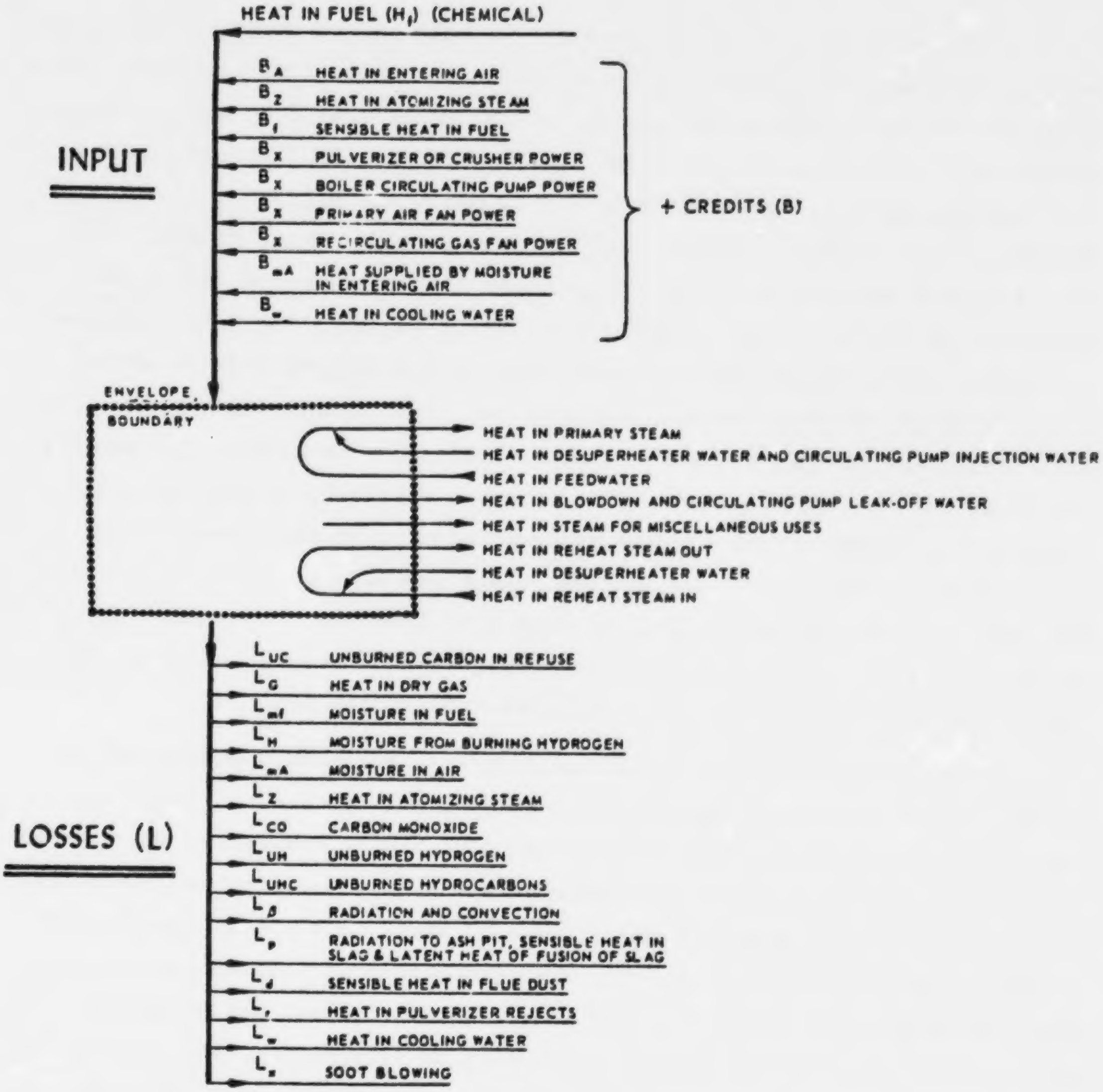
APPENDIX A

EFFICIENCY MEASUREMENTS

EFFICIENCY

Unit efficiencies for boilers are calculated and reported according to the ASME Power Test Codes for Steam Generation Units, PTC 4.1-1965. These codes present instructions for two acceptable methods of determining thermal efficiency. One method is the direct measurement of input and output and requires the accurate measurement of the quantity and high-heating value of the fuel, heat credits, and the heat absorbed by the working fluids. The second method involves the direct measurements of heat losses and is referred to as the heat loss method. This method requires the determination of losses, heat credits, and ultimate analysis and high-heat value of the fuel. Some of the major heat losses include losses due to heat in dry flue gas, losses due to fuel moisture content, losses due to combustible material in refuse and flue gas, and radiation losses. Heat credits are defined as those amounts added to the process in forms other than the chemical heat in the fuel "as fired." These include quantities such as sensible heat in the fuel, heat in the combustion air, and heat from power conversion in a pulverizer or fan. The relationships between input, output, credits, and losses for a steam generator are illustrated in Figure A-1.

KVB's experience has shown the heat-loss efficiency determination method to be the most reliable when working with industrial boilers. Accurate fuel input measurements are rarely possible on industrial boilers due to the lack of adequate instrumentation, thus making the input-output method undesirable. The accuracy of the efficiency based on the heat loss method is determined primarily by the accuracy of the flue gas temperature measurement immediately following the last heat removal station, the stack gas excess O_2 level, the fuel analysis, the ambient temperature, and proper identification of the combustion device external surfaces (for radiation losses). Determination of the radiation and other associated losses may appear to be a rather imposing calculation, but in practice it can be accomplished by utilizing standard efficiency calculation procedures. Inaccuracies in determining efficiency occasionally occur even with the heat


HEAT IN FUEL (H_f) (CHEMICAL)
INPUT
B_A HEAT IN ENTERING AIR
B_z HEAT IN ATOMIZING STEAM
B_f SENSIBLE HEAT IN FUEL
B_x PULVERIZER OR CRUSHER POWER
B_x BOILER CIRCULATING PUMP POWER
B_x PRIMARY AIR FAN POWER
B_x RECIRCULATING GAS FAN POWER
B_mA HEAT SUPPLIED BY MOISTURE IN ENTERING AIR
B_w HEAT IN COOLING WATER
+ CREDITS (B)
ENVELOPE BOUNDARY
HEAT IN PRIMARY STEAM
HEAT IN DESUPERHEATER WATER AND CIRCULATING PUMP INJECTION WATER
HEAT IN FEEDWATER
HEAT IN BLOWDOWN AND CIRCULATING PUMP LEAK-OFF WATER
HEAT IN STEAM FOR MISCELLANEOUS USES
HEAT IN REHEAT STEAM OUT
HEAT IN DESUPERHEATER WATER
HEAT IN REHEAT STEAM IN
LOSSES (L)
L_UC UNBURNED CARBON IN REFUSE
L_G HEAT IN DRY GAS
L_mf MOISTURE IN FUEL
L_H MOISTURE FROM BURNING HYDROGEN
L_mA MOISTURE IN AIR
L_z HEAT IN ATOMIZING STEAM
L_CO CARBON MONOXIDE
L_UH UNBURNED HYDROGEN
L_UHC UNBURNED HYDROCARBONS
L_β RADIATION AND CONVECTION
L_p RADIATION TO ASH PIT, SENSIBLE HEAT IN SLAG & LATENT HEAT OF FUSION OF SLAG
L_d SENSIBLE HEAT IN FLUE DUST
L_r HEAT IN PULVERIZER REJECTS
L_w HEAT IN COOLING WATER
L_x SOOT BLOWING

OUTPUT = INPUT − LOSSES

DEFINITION: EFFICIENCY (PERCENT) = $\eta_g (\%) = \frac{\text{OUTPUT}}{\text{INPUT}} \times 100 = \frac{\text{INPUT} - L}{H_f + B} \times 100$

HEAT BALANCE: $H_f + B = \text{OUTPUT} + L$ OR $\eta_g (\%) = \left[1 - \frac{L}{H_f + B} \right] \times 100$

Figure A-1. Heat balance of steam generator.

loss method primarily because of out-of-calibration unit instrumentation such as the stack gas exit temperature. However, this problem has been resolved by KVB test engineers through the use of portable instrumentation and separate temperature readings.

The abbreviated efficiency test procedure which considers only the major losses and the chemical heat in the fuel as input will be followed. Tables A-1 and A-2 are the ASME Test Forms for Abbreviated Efficiency Tests on steam generators which exemplify the type of forms to be used for recording the necessary data and performing the required calculations.

KVB has developed a program for the HP-67 calculator which will provide the heat loss efficiency from the stack data. Figure A-2 shows the HP-67 keyed calculation sheet for calculating efficiency by the ASME Heat Loss Method.

TABLE A-1

ASME TEST FORM
FOR ABBREVIATED EFFICIENCY TEST

SUMMARY SHEET PTC 4.1-a(196

	TEST NO.		BOILER NO.	DATE
OWNER OF PLANT	LOCATION			
TEST CONDUCTED BY	OBJECTIVE OF TEST			DURATION
BOILER MAKE & TYPE			RATED CAPACITY	
STOKER TYPE & SIZE				
PULVERIZER, TYPE & SIZE			BURNER, TYPE & SIZE	
FUEL USED	MINE	COUNTY	STATE	SIZE AS FIRED

PRESSURES & TEMPERATURES

1	STEAM PRESSURE IN BOILER DRUM	psia	
2	STEAM PRESSURE AT S. H. OUTLET	psia	
3	STEAM PRESSURE AT R. H. INLET	psia	
4	STEAM PRESSURE AT R. H. OUTLET	psia	
5	STEAM TEMPERATURE AT S. H. OUTLET	F	
6	STEAM TEMPERATURE AT R H INLET	F	
7	STEAM TEMPERATURE AT R.H. OUTLET	F	
8	WATER TEMP. ENTERING (ECON.)(BOILER)	F	
9	STEAM QUALITY % MOISTURE OR P. P. M.		
10	AIR TEMP. AROUND BOILER (AMBIENT)	F	
11	TEMP AIR FOR COMBUSTION (This is Reference Temperature) †	F	
12	TEMPERATURE OF FUEL	F	
13	GAS TEMP. LEAVING (Boiler) (Econ.) (Air Htr.)	F	
14	GAS TEMP. ENTERING AH (If conditions to be corrected to guarantee)	F	

UNIT QUANTITIES

15	ENTHALPY OF SAT. LIQUID (TOTAL HEAT)	Btu/lb	
16	ENTHALPY OF (SATURATED)(SUPERHEATED) STM.	Btu/lb	
17	ENTHALPY OF SAT. FEED TO (BOILER) (ECON.)	Btu/lb	
18	ENTHALPY OF REHEATED STEAM R.H. INLET	Btu/lb	
19	ENTHALPY OF REHEATED STEAM R. H. OUTLET	Btu/lb	
20	HEAT ABS/LB OF STEAM (ITEM 16 – ITEM 17)	Btu/lb	
21	HEAT ABS/LB R.H. STEAM (ITEM 19 – ITEM 18)	Btu/lb	
22	DRY REFUSE (ASH PIT + FLY ASH) PER LB AS FIRED FUEL	lb/lb	
23	Btu PER LB IN REFUSE (WEIGHTED AVERAGE)	Btu/lb	
24	CARBON BURNED PER LB AS FIRED FUEL	lb/lb	
25	DRY GAS PER LB AS FIRED FUEL BURNED	lb/lb	

HOURLY QUANTITIES

26	ACTUAL WATER EVAPORATED	lb/hr	
27	REHEAT STEAM FLOW	lb/hr	
28	RATE OF FUEL FIRING (AS FIRED wt)	lb/hr	
29	TOTAL HEAT INPUT $\frac{\text{(Item 28} \times \text{Item 41)}}{1000}$	kB/hr	
30	HEAT OUTPUT IN BLOW-DOWN WATER	kB/hr	
31	TOTAL HEAT OUTPUT $\frac{\text{(Item 26} \times \text{Item 20)} + \text{(Item 27} \times \text{Item 21)} + \text{Item 30}}{1000}$	kB/hr	

FLUE GAS ANAL. (BOILER)(ECON) (AIR HTR) OUTLET

32	CO$_2$	% VOL	
33	O$_2$	% VOL	
34	CO	% VOL	
35	N$_2$ (BY DIFFERENCE)	% VOL	
36	EXCESS AIR	%	

FUEL DATA

	COAL AS FIRED PROX. ANALYSIS	% wt		OIL	
37	MOISTURE		51	FLASH POINT F*	
38	VOL MATTER		52	Sp. Gravity Deg. API*	
39	FIXED CARBON		53	VISCOSITY AT SSU* BURNER SSF	
40	ASH		44	TOTAL HYDROGEN % wt	
	TOTAL		41	Btu per lb	
41	Btu per lb AS FIRED				
42	ASH SOFT TEMP.* ASTM METHOD			GAS	% VO
	COAL OR OIL AS FIRED ULTIMATE ANALYSIS		54	CO	
43	CARBON		55	CH$_4$ METHANE	
44	HYDROGEN		56	C$_2$H$_2$ ACETYLENE	
45	OXYGEN		57	C$_2$H$_4$ ETHYLENE	
46	NITROGEN		58	C$_2$H$_6$ ETHANE	
47	SULPHUR		59	H$_2$S	
40	ASH		60	CO$_2$	
37	MOISTURE		61	H$_2$ HYDROGEN	
	TOTAL			TOTAL	
	COAL PULVERIZATION			TOTAL HYDROGEN % wt	
48	GRINDABILITY INDEX*		62	DENSITY 68 F ATM. PRESS.	
49	FINENESS % THRU 50 M*		63	Btu PER CU FT	
50	FINENESS % THRU 200 M*		41	Btu PER LB	

64	INPUT-OUTPUT EFFICIENCY OF UNIT %	$\frac{\text{ITEM 31} \times 100}{\text{ITEM 29}}$

	HEAT LOSS EFFICIENCY	Btu/lb A. F. FUEL	% of FUE
65	HEAT LOSS DUE TO DRY GAS		
66	HEAT LOSS DUE TO MOISTURE IN FUEL		
67	HEAT LOSS DUE TO H$_2$O FROM COMB. OF H$_2$		
68	HEAT LOSS DUE TO COMBUST. IN REFUSE		
69	HEAT LOSS DUE TO RADIATION		
70	UNMEASURED LOSSES		
71	TOTAL		
72	EFFICIENCY = (100 – Item 71)		

* Not Required for Efficiency Testing

† For Point of Measurement See Par. 7.2.8.1-PTC 4.1-1964

TABLE A-2

PTC 4.1-b (1964)

ASME TEST FORM

CALCULATION SHEET

FOR ABBREVIATED EFFICIENCY TEST

Revised September, 1965

OWNER OF PLANT	TEST NO.	BOILER NO.	DATE

30 HEAT OUTPUT IN BOILER BLOW-DOWN WATER = LB OF WATER BLOW-DOWN PER HR $\times \left[\frac{\overset{\text{ITEM 15}}{\ldots\ldots} - \overset{\text{ITEM 17}}{\ldots\ldots}}{1000}\right]$ = ... kB/hr

24 *If impractical to weigh refuse, this item can be estimated as follows*

DRY REFUSE PER LB OF AS FIRED FUEL = $\frac{\text{\% ASH IN AS FIRED COAL}}{100 - \text{\% COMB. IN REFUSE SAMPLE}}$

CARBON BURNED PER LB AS FIRED FUEL $= \frac{\overset{\text{ITEM 43}}{\ldots\ldots}}{100} - \left[\frac{\overset{\text{ITEM 22}}{\ldots\ldots} \times \overset{\text{ITEM 23}}{\ldots\ldots}}{14{,}500}\right]$ = ...

NOTE: IF FLUE DUST & ASH PIT REFUSE DIFFER MATERIALLY IN COMBUSTIBLE CONTENT, THEY SHOULD BE ESTIMATED SEPARATELY. SEE SECTION 7, COMPUTATIONS.

25 DRY GAS PER LB AS FIRED FUEL BURNED $= \frac{11CO_2 + 8O_2 + 7(N_2 + CO)}{3(CO_2 + CO)} \times$ (LB CARBON BURNED PER LB AS FIRED FUEL $+ \frac{3}{8}S$)

$$= \frac{11 \times \overset{\text{ITEM 32}}{\ldots\ldots} + 8 \times \overset{\text{ITEM 33}}{\ldots\ldots} + 7\left(\overset{\text{ITEM 35}}{\ldots\ldots} + \overset{\text{ITEM 34}}{\ldots\ldots}\right)}{3 \times \left(\overset{\text{ITEM 32}}{\ldots\ldots} + \overset{\text{ITEM 34}}{\ldots\ldots}\right)} \times \left[\overset{\text{ITEM 24}}{\ldots\ldots} + \frac{\overset{\text{ITEM 47}}{\ldots\ldots}}{267}\right] = \ldots\ldots$$

36 EXCESS AIR† $= 100 \times \frac{O_2 - \frac{CO}{2}}{.2682N_2 - (O_2 - \frac{CO}{2})} = 100 \times \frac{\text{ITEM 33} - \frac{\text{ITEM 34}}{2}}{.2682\,(\text{ITEM 35}) - (\text{ITEM 33} - \frac{\text{ITEM 34}}{2})}$ = ...

	HEAT LOSS EFFICIENCY	Btu/lb AS FIRED FUEL	$\frac{\text{LOSS}}{\text{HHV}} \times 100 =$	LOSS %
65	HEAT LOSS DUE TO DRY GAS = LB DRY GAS PER LB AS FIRED FUEL $\times C_p \times (t_{lvg} - t_{air})$ = $\overset{\text{ITEM 25}}{\ldots\ldots} \times \overset{\text{0.24}}{\ldots\ldots} \times$ (ITEM 13) – (ITEM 11) = ... Unit	......	$\frac{65}{41} \times 100 =$	......
66	HEAT LOSS DUE TO MOISTURE IN FUEL = LB H_2O PER LB AS FIRED FUEL × [(ENTHALPY OF VAPOR AT 1 PSIA & T GAS LVG) – (ENTHALPY OF LIQUID AT T AIR)] = $\frac{\text{ITEM 37}}{100}$ × [(ENTHALPY OF VAPOR AT 1 PSIA & T ITEM 13) – (ENTHALPY OF LIQUID AT T ITEM 11)] = ...	......	$\frac{66}{41} \times 100 =$	......
67	HEAT LOSS DUE TO H_2O FROM COMB. OF H_2 = $9H_2$ × [(ENTHALPY OF VAPOR AT 1 PSIA & T GAS LVG) – (ENTHALPY OF LIQUID AT T AIR)] = 9 × $\frac{\text{ITEM 44}}{100}$ × [(ENTHALPY OF VAPOR AT 1 PSIA & T ITEM 13) – (ENTHALPY OF LIQUID AT T ITEM 11)] = ...	......	$\frac{67}{41} \times 100 =$	......
68	HEAT LOSS DUE TO COMBUSTIBLE IN REFUSE = $\overset{\text{ITEM 22}}{\ldots\ldots} \times \overset{\text{ITEM 23}}{\ldots\ldots}$ = ...	......	$\frac{68}{41} \times 100 =$	......
69	HEAT LOSS DUE TO RADIATION* = $\frac{\text{TOTAL BTU RADIATION LOSS PER HR}}{\text{LB AS FIRED FUEL} - \text{ITEM 28}}$	......	$\frac{69}{41} \times 100 =$	......
70	UNMEASURED LOSSES **	......	$\frac{70}{41} \times 100 =$	......
71	TOTAL	......	......	......
72	EFFICIENCY = (100 – ITEM 71)	......	......	......

† For rigorous determination of excess air see Appendix 9.2 – PTC 4.1-1964

* If losses are not measured, use ABMA Standard Radiation Loss Chart, Fig. 8, PTC 4.1-1964

** Unmeasured losses listed in PTC 4.1 but not tabulated above may by provided for by assigning a mutually agreed upon value for Item 70.

FIGURE A-2

HP-67 KEYED CALCULATION SHEET

ASME ABBREVIATED EFFICIENCY CALCULATION - HEAT LOSS METHOD

Test No.________ Date________ Location______________ Unit No.________ Fuel________

(Turn Calculator Off and Then On. Load Program Card.)

A. FROM FUEL ANALYSIS:

Wt. % in as-fired fuel: C ________% A1:(STO 0), Moisture ________% A2:(STO 1), H ________% A3:(STO 2), S ________% A4:(STO 3)

High heating value of fuel as-fired ________ Btu/lb A5:(STO 4)

B. FROM FLUE GAS ANALYSIS:

Volume % in flue gas of: O_2 ________% B1:(STO 5), CO_2 ________% B2:(STO 6), CO ________% B3:(STO 7)

C. FROM REFUSE (FLY ASH AND ASH PIT) ANALYSIS:

C1. Fraction of dry refuse in fuel ________ lbs dry refuse/lb as-fired fuel (STO 8)

C2. Heating value of dry refuse (weighted average) ________ Btu/lb dry refuse (STO 9)

C3. Wt. % of combustibles in refuse (f P $\gtrless$ S) ________% (STO 4) (f P $\gtrless$ S)

D. MEASURED TEMPERATURES

D1. Gas temp. leaving boiler, econ. or air heater ________°F (STO A)

D2. Comb. air temp. ________°F (STO B)

E. FROM STEAM TABLES:

E1. Enthalpy: $H_2O(g)$ at temp. D1 & 1 psia ________ Btu/lb (STO C)

E2. Enthalpy: $H_2O(l)$ at comb. air temp. ________ Btu/lb (STO D)

F. FROM ABMA STANDARD RADIATION LOSS CHART (UNLESS MEASURED):

F1. Heat loss due to radiation ________% of gross heat input (STO E)

G. FROM UNIT SPECIFICATIONS (if available, otherwise enter 0):

G1. Unmeasured losses (f P $\gtrless$ S) ________% of gross heat input (STO 0) (f P $\gtrless$ S)

---

1. Excess Air $\approx \dfrac{100\ (2B1 - B3)}{0.5364(100 - B1 - B2) - (2B1 - B3)}$ (A)________%

2. (Optional) Pounds dry gas per pound of fuel =

$$\frac{B1 + 4B2 + 700}{3(B2 + B3)} \times \left[\frac{A1}{100} - \frac{C1 \times C2}{14500\left(1 - \frac{C3}{100}\right)} + \frac{3A4}{800}\right]$$

(R/S)________ lbs dry gas/lb as-fired fuel

Heat Losses	% of Gross Heat Input	(Optional) Btu/lb as-fired fuel*
3. Due to dry gas = $\dfrac{24 \times EQ.2 \times (D1 - D2)}{A5}$	(B)________	(R/S)________
4. Due to moisture in fuel = $\dfrac{A2 \times (E1 - E2)}{A5}$	(C)________	(R/S)________
5. Due to H_2O from combustion of H_2 = $\dfrac{9 \times A3(E1 - E2)}{A5}$	(D)________	(R/S)________
6. Due to combustibles in refuse = $\dfrac{100 \times C1 \times C2}{A5}$	(E)________	(R/S)________
7. Total Losses = Sum of calculated losses + F1 + G1	(f a)________	(R/S)________
8. Efficiency = 100 - Total Losses	(f b)________	

*Calculated as percent of gross heat input x A5 ÷ 100

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11/7/78

APPENDIX B

DATA RECORDING FORMATS

DOCUMENTATION OF RESULTS

Field Measurements

During testing, two sets of measurements are recorded: 1) control room data which indicate the operating condition of the device and 2) emissions data that are the readouts of the individual analyzers.

The concentration of nitric oxide (NO), carbon dioxide (CO_2), carbon monoxide (CO), and oxygen (O_2) are measured and recorded. The concentration of these species are measured and displayed continuously by analyzers and strip chart recorders mounted in a console. The strip chart recordings are retained for future reference.

A number of data sheets have been developed for use in field measurements. These data sheets are listed below together with their purpose. An example of each sheet follows.

Figure No.	Title	Purpose
B-1	Thirty-Day Field Test Data Sheets	Record control room data
B-2	Gaseous Emissions Data	Record Gaseous Emissions Analyzer data
B-3	Nozzle Size, Q_m and ΔH Calculations	Calculate nozzle size, flow rate, and ΔH for Method 5 Test
B-4	Response Time for Continuous Instruments	Continuous monitor certification
B-5	Zero and Calibration Drift (24 hr)	Continuous monitor certification
B-6	Zero and Calibration Drift (2 hr)	Continuous monitor certification
B-7	Accuracy Determination (NOx)	Continuous monitor certification
B-8	Calibration Error Determination	Continuous monitor certification

Figure No.	Title	Purpose
B-9	Analysis of Calibration Gas Mixture	Continuous monitor certification
B-10	Particulate Calculation Sheet	Calculate weight of solid particulate catch
B-11	Stack Data	Record volumes, temperatures, pressures of Method 5 control unit.
B-12	Particulate Emission Caculations	Calculate particulate emmision factors
B-13	Velocity Traverse	Record temperature and velocity profile of stack
B-14	Liquid or Solid Fuel Calculation	Calculate stoichiometric properties of fuel

Figure B-1.

KVB, Inc.

THIRTY DAY FIELD TEST DATA SHEET

Site ____________________ Fuel ____________________

Test No.			
Date			
Time			
Load			
Test Description			
Windbox, in. H_2O			
Furnace, in. H_2O			
Overfire air, in. H_2O			
Boiler exit, in. H_2O			
Economizer exit, in. H_2O			
ID fan inlet, in. H_2O			
Steam flow, kpph			
Integrated steam flow Time/ k lbs			
Air flow indic.			
Superheater outlet temp. °F			
Flue gas temp, economizer inlet, °F			
Flue gas temp, economizer outlet, °F			
Temp F.W. economizer outlet, °F			
Feed Water Control, %			
Temp F.W. heater, °F			
F.W. economizer inlet, °F			
Steam pressure, psig			
Fuel feed			
Overfire air damper			
F.D. fan			
F.D. fan damper			
I.D. fan			
I.D. fan damper			

(continued)

Data Sheet 6017-26
12/12/78

Figure B-1. (Continued)

THIRTY DAY FIELD TEST DATA SHEET

Page 2

Test No.			
Smoke Indicator Chart			
Rotary speed			
Spill plate setting			
Grate speed			
Overfire air damper, % open			
Fuel flow, Time/lbs			
Flame observations			
Bed thickness			
General furnace appearance			
Clinkers			
Ambient air temp, °F & F.D. fan inlet temp.			

Comments:

Figure B-2.

KVB, INC.

GASEOUS EMISSIONS DATA

Date________________

Engr._______________

Low NO$_x$ Control Method____

Unit No.___________________________ Location____________________

Fuel______________________________ Capacity____________________

Unit Type__________________________ Burner Type__________________

1. Test No.					
2. Time					
3. Load					
4. Process Rate					
5. Flue Diam. or Size, ft					
6. Probe Position					
7. Oxygen (%)					
8. NO$_x$ (hot) read/3% O$_2$ (ppm)					
9. NO (hot) read/3% O$_2$ (ppm)					
10. NO$_2$ (hot) read/3% O$_2$ (ppm)					
11. Carbon Dioxide (%)					
12. Carbon Monoxide (ppm) uncor/cor					
13. Opacity					
14. Atmos. Temp. (°F/°C)					
15. Dew Point Temp. (°F/°C)					
16. Atmos. Pressure (in. Hg)					
17. Relative Humidity (%)					

Data Sheet
6015-23
9/29/78

Figure B-3.

HP-67 Keyed Calculation Sheet

NOZZLE SIZE, Q_m and ΔH CALCULATIONS

Test No.__________ Date__________ Location__________

Unit No.__________ Fuel__________ Sampling Method__________

Crew: Engr.__________ Techs.__________

DATA

Constants		Key
Pitot Factor, F_s	______	(STO 1)
Orifice Factor, J	______	(STO 2)
Orifice Diam., D_o (in.)	______	(STO 3)
Ideal Meter Flow, Q_n (ACFM)	______	(STO 4)

NOTE: TO RECALCULATE IDEAL NOZZLE SIZE, RESTORE DATA IN REGISTERS 4 THRU 8, CLEAR STACK AND RE-ENTER % H_2O, % O_2, and % CO_2

Actual Conditions		Key
Meter Temperature, T_m(°F)	______	(STO 5)
Barom. Press., P_{Bar} (in. Hg)	______	(STO 6)
Static Press. Diff., ΔP_s (iwg)	______	(STO 7)
Nozzle Temp., T_n (°F)	______	(STO 8)
Stack Vel. Press., Δp (iwg)	______	(STO 9)

Gaseous Stack Composition			
% H_2O	(%)	______	ENTER
% O_2 dry	(%)	______	ENTER
% CO_2 dry	(%)	______	

IDEAL NOZZLE CALCULATION

(A) Ideal Nozzle Size, $D_{n(Ideal)}$	______	inches

METER FLOW RATE AND ORIFICE PRESS. DIFF. CALCULATIONS

Actual Nozzle Size, $D_{n(Actual)}$	______	inches
(C) Actual Meter Flow Rate, $Q_{m(Actual)}$	______	ACFM (on meter)
(RCL 7) Orifice Press. Diff., ΔH to obtain $Q_{m(Actual)}$	______	iwg

NOTE: To Determine Q_m and ΔH for Other Actual Nozzle Size, Key in $D_{n(Actual)}$, Press C for Q_m, then RCL 7 for ΔH.

For one $D_{n(Actual)}$ with Changing Stack Velocity Pressure (Δp) and Nozzle Temperature (T_n)
(It is not necessary to restore data in registers 4-8 for these calculations)

Δp (ENTER) (iwg)	T_n (°F)	(E) Q_m (ACFM)	(R/S) ΔH' (iwg)

EQUATIONS

(1) $M_d = 1/25\ (4\ \%\ CO_2 + \%\ O_2) + 28$ (lb/lb mole) (2) $M_s = M_d \left(\frac{\%\ H_2O - 100}{-100}\right) + \frac{18}{100}\ (\%\ H_2O)$ (lb/lb mole)

(3) $P_s = 13.6\ P_{Bar} + \Delta P_s$ (in. of water) (4) $v_n = 18892\ F_s \sqrt{[\Delta p\ (T_n + 460)]/P_s\ M_s}$ (ft/min)

$$(5)\quad Q_m = \frac{Q_{n(Ideal)}\ (T_n + 460)\ 13.6\ P_{Bar}\ [828475\ \pi^2 J^2 D_o^{\,4}\ (T_m + 460)]}{[1 - (\%\ H_2O/100)]\,(T_m + 460)\ P_s\,[828475\ \pi^2 J^2 D_o^{\,4}\ (T_m + 460) - 768\ M_d\ Q^2_{m(Ideal)}]} \qquad \text{(ACFM)}$$

(6) $D_{n(Ideal)} = \sqrt{183.35\ (Q_n/V_n)}$ (in.) (7) $Q_{n(Actual)} = [V_n\ D^2_{n(Actual)}]/183.35$ (ACFM)

$$(8)\quad Q_{m_i} = \frac{Q_{n(Actual)}\ (T_m + 460)\,(1 - \%\ H_2O/100)\,(13.6\ P_{Bar} + \Delta P_s)}{(T_n + 460)\,(13.6\ P_{Bar} + \Delta H_{i-1})} \quad \text{assume } \Delta H_o = \Delta P_s \qquad \text{(ACFM)}$$

$i = 1,n$ where n = number of iterations to obtain $\Delta H_{i\ s.t.}$ $\frac{(\Delta H_{i-1} - \Delta H_i)}{\Delta H_{i-1}} \leq 0.001$

$$(9)\quad \Delta H_i = \frac{768\ Q_{m_i}^{\ 2}\ M_d\ 13.6\ P_{Bar}}{828475\ \pi^2 J^2 D_o^{\,4}\ (T_m + 460) - 768\ Q_{m_i}^{\ 2}\ M_d} \qquad \text{(in. of water)}$$

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Figure B-4.

KVB

Engineer____________

MONITOR PERFORMANCE TEST DATA SHEET

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

Date of Test ____________

Span Gas Concentration __________ppm

Analyzer Span Setting __________ppm

	1	__________seconds
Upscale	2	__________seconds
	3	__________seconds

Average upscale response ________seconds

	1	__________seconds
Downscale	2	__________seconds
	3	__________seconds

Average downscale response ________seconds.

System average response time (slower time) = __________seconds.

% deviation from slower system average response $= \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% =$ ____.

Data Sheet 6017-35
40CFR60/App. B
7/1/77

Figure B-5.

KVB

Engineer ____________

MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)

Zero Drift = [Mean Zero Drift* ________ + C.I. (Zero) ________]
÷ [Instrument Span] x 100 = ________.

Calibration Drift = [Mean Span Drift* ________ + C.I. (Span) ________]
÷ [Instrument Span] x 100 = ________.

*Absolute Value

Data Sheet 6017-34
40CFR60/App. B
7/1/77

Figure B-6.

KVB

MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (2 HOUR)

Engineer________________

Data Set No.	Time		Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span-Zero)
	Begin	End						
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Zero Drift = [Mean Zero Drift* ________ + CI (Zero) ________] ÷ [Span] x 100 = ________.

Calibration Drift = [Mean Span Drift* ________ + CI (Span) ________] ÷ [Span] x 100 = ________.

*Absolute Value.

Data Sheet 6017-33
40CFR60/App. B
7/1/77

Figure B-7.

KVB

MONITOR PERFORMANCE TEST DATA SHEET

ACCURACY DETERMINATION (NO_x)

Engineer________________

Test No.	Date and Time	Reference Method Samples				Analyzer 1-Hour Average (ppm)* NO_x		Difference (ppm) NO_x	
		NO_x Sample 1 (ppm)	NO_x Sample 2 (ppm)	NO_x Sample 3 (ppm)	NO_x Sample Average (ppm)				
1									
2									
3									
4									
5									
6									
7									
8									
9									

Mean reference method test value (NO_x) ____________

Mean of the differences ____________

95% Confidence intervals = ± __________ ppm (NO_x)

Accuracies = $\frac{\text{Mean of the differences + 95\% confidence interval}}{\text{Mean reference method value}}$ x 100 = ________% (NO_x)

* Explain and report method used to determine integrated averages

Data Sheet 6017-32

40CFR60/App. B
7/1/77

Figure B-8.

KVB

Engineer ____________

MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

Calibration Gas Mixture Data

Mid (50%) _____ ppm High (90%) _____ ppm

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences[1], ppm
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

	Mid	High
Mean difference	_____	_____
Confidence interval	+ _____	+ _____
Calibration error = $\frac{\text{Mean Difference}^{2} + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	_____ %	_____ %

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

Data Sheet 6017-31
40CFR60/App. B
7/1/77

Figure B-9.

KVB

Engineer_______________

MONITOR PERFORMANCE TEST DATA SHEET

ANALYSIS OF CALIBRATION GAS MIXTURES

Date:_________________________

Reference Method Used:________

Mid-Range Calibration Gas Mixture

Sample 1 ____________________ppm

Sample 2 ____________________ppm

Sample 3 ____________________ppm

Average ____________________ppm

High-Range (span) Calibration Gas Mixture

Sample 1 ____________________ppm

Sample 2 ____________________ppm

Sample 3 ____________________ppm

Average ____________________ppm

Data Sheet 6017-30
40CFR60/App. B
7/1/77

Figure B-10.

PARTICULATE CALCULATION SHEET

Test Crew____________

Test No.__________ Date__________ Location____________________
Box No.__________ Sample Probe Position____________________
Test Description

Dry Gas Meter Vol. (ft^3)
Final ________
Initial ________
Total ________

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final					
Initial					
Δ Vol					

Beaker No.					Filter No.	Blank No.
Date Weighed						
Tare Wt. 1						
2						
3						
4						
5						
6						
Avg						
Bottle No.						
Content Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)						
Date Weighed or 250 Bake						
Final Wt. 250 1						
2						
3						
4						
5						
6						
Avg						
Residue wt Final 250-Tare						
Date Weighed or 650 Bake						
Final Wt. 650 1						
2						
3						
4						
5						
6						
Avg						
Residue Wt Final 650-Tare						

Comments:

Data Sheet 6002-3

Figure B-11.

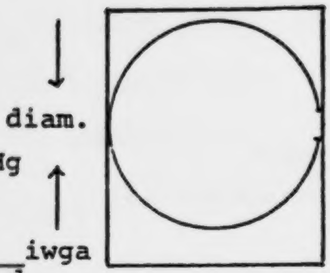
K V B. INC.

Test No._____
Engr.________

STACK DATA

Date__________ Location__________ Unit No.__________ Fuel____________
Load__________ K#/hr or MBtu/hr Filter No.________
Sample Box No._____ Meter Box No._____ Probe No._____ Probe Length_____

Filter Heater Setting _____
Probe Heater Setting _____
Stack Moisture _____ %
Ambient Temperature _____ °F
Nozzle Diameter _____ in.
Atmospheric Pressure _____ in.Hg
Weather _______________
Stack Gas Pressure, Ps _____ iwg
Abs. Stack Press., AP=P_s+407=____ iwga
Stack Gas Sp. Gravity, Gs_____ n.d.
Stack Area, As _______ ft^2



Remarks
Final Meter: ____________
Initial Meter: ____________

Time	Vm Meter Volume Reading (CF)	Vacuum Gage Reading (iwg)	ΔP Pitot Tube Pressure (iwg)	H Orfice Pressure Diff (°F)	Stack Temp. (°F)	Impinger Temperature Out (°F)	Impinger Temperature In (°F)	Filter Box Temp. (°F)	Meter Temp. (°F)
Total					°F				
Avg.					°F				
					+ 460				

Ts= ______ °R

60-13

11/20/75

HP-67 KEYED CALCULATION SHEET*

Figure B-12.

PARTICULATE EMISSION CALCULATIONS

Test No.________ Date________ Location________________ Engr.________

Unit No.________ Fuel________ Sampling Train and Method ________________

Pitot Factor, Fs .83________ Barometric Pressure, P_{bar} ________ (STO 0) in. Hg

Tot. Liquid Collected, V_{1c} ________ (STO 1) ml Total Particulate, M_n ________ (STO 2) m gm

Velocity Head, ΔP ________ (STO 3) iwg Stack Temp., Ts ________ (STO 4) °F Stack Area, As ________ (STO 5) ft^2

Sample Volume, Vm ________ (STO 6) ft^3 Stack Press., Psg ________ (STO 7) iwg Excess O_2, XO_2% ________ (STO 8) %

Orifice Press. Diff., H ________ (STO 9) iwg, (Flue Gas Density/Air Density) @ T_s, Gs ________ (STO A) n.d.

Sample Time, θ ________ (STO B) min Nozzle Dia., Dn ________ (STO C) in. Meter Temp., T_m ________ (STO D) °F

Select Fe	Oil (A)	Gas (B)	Coal (C)	Other:
SC Feet/10^4 Btu	92.2	87.4	98.2	(J)

Press (E) if meter is not temperature compensated.

1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ ________ SCF
2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ ________ SCF
3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) ________ N.D.
4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ ________ grains/DSCF
   b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ ________ lb/DSCF
   c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ ________ grams/DSCM
5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ ________ in. w abs.
6. Stack Gas Speed $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ ________ ft/min
7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ ________ WSCF/min
   b. Qsd = Eq. 7a x (1. - Eq. 3) ________ DSCF/min
8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 ________ lb/hr
9. XO_2 factor $XO_2f = 2090/(20.9 - XO_2\%)$ ________ N.D.
10. Emission a. E = Eq. 4b x Fe x Eq. 9 ________ lb/MMBtu
    b. E = Eq. 4c x Fm x Eq. 9 x 1000 ________ ng/joule
11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ ________ %

*If calculating by hand:
1) Convert T_s and T_m to °R
2) Multiply EQ 1 by $530/T_m$(°R) if meter not temperature compensated.
3) $F_m = 2.684 \times 10^{-5} \times F_e$

Data Sheet 6002-4
Revised 9/27/78

Figure B-13.

KVB, Inc.

VELOCITY TRAVERSE

Project: ____________ Test Description: ____________

Date: ____________

Location: ____________

Unit: ____________

Test: ____________ Personnel: ____________

Fuel: ____________

Barometric Press. (in. Hg): ____________

Absolute Static Press. in Stack (in. Hg): ____________ (P_s)

Pitot Tube Coefficient: ____________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			ΔP		T_S	M_S	V_S	

Figure B-14.

KVB

Test No.__________ Date____________ Location______________________ Unit No.________

Fuel________________ Fuel Sample No.__________________ Fuel Sample Point________

LIQUID OR SOLID FUEL CALCULATIONS

(f)(CL REG), (f) (P⇄S), (f)(CL REG), Load data card, then PGRM card (both sides)

*Input HHV (Btu/lb) ______________, (A)
*Input wt % C ______________, (R/S)
*Input wt % H ______________, (R/S)
*Input wt % S ______________, (R/S)
*Input wt % O ______________, (R/S)
*Input wt % N ______________, (R/S) - decimal point blinks after pressing; item #1 displayed

1. Dry stoichiometric moles flue gas/lb fuel = ______________.
(One may proceed to items 9, 17, or 18 by pressing (f)(A), (E), or entering MW and pressing (B), respectively.)

- -

*Input wt % H_2O in fuel (0 if none) ______________

(C) 2. Moles H_2O in flue gas/lb fuel ______________
(R/S) 3. Total moles of flue gas (stoichiometric)/lb fuel ______________
(R/S) 4. Dry volume/wet volume ______________
(R/S) 5. Volume % H_2O in flue gas ______________
(R/S) 6. Volume % CO_2, dry in flue gas ______________
(R/S) 7. SO_2 (ppm by vol.), dry at stoichiometric ______________
(R/S) 8. NO (ppm by vol.), dry at stoichiometric ______________

- -

(f)(A) 9. Stoichiometric air/fuel ratio (lb air/lb fuel) ______________

- -

(Before items 10-16 may be determined, items 1-9 must be completed.)

(D) - 20.95 displayed

*Input measured vol. % O_2 for O_2 correction ______ ______ ______ ______

(R/S) 10. $\frac{\text{Gas moles at \% } O_2}{\text{Gas moles, stoic.}} = \frac{20.95}{20.95 - \% \, O_2} =$ ______ ______ ______ ______
(R/S) 11. Dry moles flue gas/lb fuel at % O_2 ______ ______ ______ ______
(R/S) 12. Vol. % CO_2, dry at % O_2 ______ ______ ______ ______
(R/S) 13. SO_2 (ppm by vol.) dry at % O_2 ______ ______ ______ ______
(R/S) 14. NO (ppm by vol.) dry at % O_2 ______ ______ ______ ______
(R/S) 15. Vol. % H_2O at % O_2 ______ ______ ______ ______
(R/S) 16. Percent Excess Air ______ ______ ______ ______
(decimal pt. blinks) ______ ______ ______ ______

- -

(RCL)(2)(E) 17. Converts item 1 to SCF dry flue gas at stoich/10^6 Btu = ______________

- -

Item 18.

a. *Input MW, (B), program calculates K (lb/10^6 Btu = ppm/K)
(MW = 46 for NOx, CO = 28, HC = 16, SOx = 64)

1. *Input measured ppm at 3% O_2, dry, (R/S), program calculates lb/10^6 Btu.
2. (Optional) No input, (R/S), program converts lb/10^6 Btu - ng/J
3. Repeat steps (1) and (2) as necessary.

b. *Enter next value of MW, complete step (a) followed by steps (1), (2), and (3). Repeat for all species desired.

	MW	K for lb/10^6 Btu
NOx	46	______
CO	28	______
HC	16	______
SOx	64	______

---

*Indicates input is required

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Revised 7/6/78

APPENDIX C

CONTINUOUS MONITOR CERTIFICATION DATA SHEETS

KVB

Engineer K.

MONITOR PERFORMANCE TEST DATA SHEET

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

NO Instrument

Date of Test 8-4-80

Span Gas Concentration 234 ppm

Analyzer Span Setting 250 ppm

Upscale
1 25 seconds
2 27 seconds
3 27 seconds

Average upscale response 26.3 seconds

Downscale
1 29 seconds
2 29 seconds
3 30 seconds

Average downscale response 29.3 seconds.

System average response time (slower time) = 29.3 seconds.

$$\text{\% deviation from slower system average response} = \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% = 10.2.$$

KVB

Engineer Bc

MONITOR PERFORMANCE TEST DATA SHEET

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

CO2 Instrument

Date of Test 9-4-80

Span Gas Concentration 17.8 ~~ppm~~ %

Analyzer Span Setting 20 ~~ppm~~ %

Upscale	1	44 seconds
	2	47 seconds
	3	43 seconds

Average upscale response 44.7 seconds

Downscale	1	49 seconds
	2	55 seconds
	3	51 seconds

Average downscale response 51.7 seconds.

System average response time (slower time) = 51.7 seconds.

$$\text{\% deviation from slower system average response} = \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% = 13.5.$$

KVB

Engineer Ku

MONITOR PERFORMANCE TEST DATA SHEET

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

O2 Instrument

Date of Test 9-4-80

Span Gas Concentration 9.3 ~~ppm~~ %

Analyzer Span Setting 10 ~~ppm~~ %

Upscale

1 23 seconds
2 25 seconds
3 25 seconds

Average upscale response 24.3 seconds

Downscale

1 27 seconds
2 26 seconds
3 28 seconds

Average downscale response 27.0 seconds.

System average response time (slower time) = 27.0 seconds.

% deviation from slower system average response $= \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% =$ 10.0.

KVB

Engineer KS

MONITOR PERFORMANCE TEST DATA SHEET

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

CO Instrument

Date of Test 8·4·80

Span Gas Concentration 900 ppm

Analyzer Span Setting 1000 ppm

Upscale	1	39 seconds
	2	40 seconds
	3	42 seconds

Average upscale response 40 seconds

Downscale	1	40 seconds
	2	40 seconds
	3	43 seconds

Average downscale response 41 seconds.

System average response time (slower time) = 41 seconds.

$$\text{\% deviation from slower system average response} = \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% = \underline{2.4}.$$

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NO INSTRUMENT [illegible]

MONITOR PERFORMANCE TEST DATA SHEET
ZERO AND CALIBRATION DRIFT (2 HOUR)

Data Set No.	Time		Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span-Zero)
	Begin	End						
1 START	08:30		8-5-80	0	–	234	–	–
2	10:30			0	0	235	1	1
3	12:30			5	5	234	-1	-6
4	14:30			0	-5	234	0	5
5 START	08:30		8-6-80	0	–	234	–	–
6	10:30			0	0	234	0	0
7	12:30			5	5	233	-1	-6
8	14:30			3	2	234	0	-2
9	16:30			3	0	234	0	0
10 START	08:30		8-7-80	0	–	234	–	–
11	10:30			1	1	235	1	-2
12	12:30			1	0	233	-1	0
13	14:30			1	0	234	0	0
14	16:30			1	0	234	0	0
15 START	08:30		8-8-80	0	–	234	–	–
16	10:30			3	3	234	0	-3
17	12:30			3	0	234	0	0
18	14:30			5	2	234	0	-2
19								
20								

Zero Drift = [Mean Zero Drift* 1.64 + CI (Zero) 1.19] ÷ [Span] x 100 = 1.13 .

Calibration Drift = [Mean Span Drift* .357 + CI (Span) .287] ÷ [Span] x 100 = .258 .

*Absolute Value.

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CO₂ [illegible] 0-20%

MONITOR PERFORMANCE TEST DATA SHEET
ZERO AND CALIBRATION DRIFT (2 HOUR)

Data Set No.	Time		Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span-Zero)
	Begin	End						
1 START	08:30		8-5-80	0	—	17.8	—	—
2	10:30			0	0	17.8	0	0
3	12:30			0	0	17.8	0	0
4	14:30			0	0	17.8	0	0
5 START	08:30		8-6-80	0	—	17.8	—	—
6	10:30			0	0	17.8	0	0
7	12:30			0	0	17.8	0	0
8	14:30			0	0	17.8	0	0
9	16:30			0	0	17.3	0.5	0.5
10 START	08:30		8-7-80	0	—	17.8	—	—
11	10:30			0	0	17.8	0	0
12	12:30			0	0	17.8	0	0
13	14:30			0	0	17.8	0	0
14	16:30			0	0	17.8	0	0
15 START.	08:30		8-8-80	0	—	17.8	—	—
16	10:30			0	0	17.8	0	0
17	12:30			0	0	17.0	0.8	0.8
18	14:30			-1	-1	17.8	+0.8	+1.8
19								
20								

Zero Drift = [Mean Zero Drift* .143 + CI (Zero) .15] ÷ [Span] x 100 = 1.65.

Calibration Drift = [Mean Span Drift* .150 + CI (Span) .176] ÷ [Span] x 100 = 1.63.

*Absolute Value.

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MONITOR PERFORMANCE TEST DATA SHEET
ZERO AND CALIBRATION DRIFT (2 HOUR)

O2 INSTRUMENT 0-25%

Data Set No.	Time		Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span-Zero)
	Begin	End						
1 START	08:30		8-5-80	DNA	DNA	9.27	–	–
2	10:30					9.27	0	0
3	12:30					9.27	0	0
4	14:30					9.27	0	0
5 START	08:30		8-6-80			9.27	–	–
6	10:30					9.27	0	0
7	12:30					9.27	0	0
8	14:30					9.27	0	0
9	16:30					9.27	0	0
10 START	08:30		8-7-80			9.27	-	-
11	10:30					9.27	0	0
12	12:30					9.27	0	0
13	14:30					9.27	0	0
14	16:30					9.27	0	0
15 START	08:30		8-8-80			9.27	–	–
16	10:30					9.27	0	
17	12:30					9.20	-0.07	0.07
18	14:30					9.27	0.07	0.07
19								
20								

Zero Drift = [Mean Zero Drift* — + CI (Zero) —] ÷ [Span] x 100 = — .

Calibration Drift = [Mean Span Drift* 0.01 + CI (Span) .009] ÷ [Span] x 100 = .015 .

*Absolute Value.

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MONITOR PERFORMANCE TEST DATA SHEET
ZERO AND CALIBRATION DRIFT (2 HOUR)

CO [illegible] 0 - [illegible]

Data Set No.	Time		Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span-Zero)
	Begin	End						
1 START	08:30		8-5-80	0	–	900	–	–
2	10:30			0	0	900	0	0
3	12:30			2	2	895	-5	-3
4	14:30			0	0	900	0	0
5 START	08:30		8-6-80	0	–	900	–	–
6	10:30			0	0	900	0	0
7	12:30			0	0	900	0	0
8	14:30			0	0	900	0	0
9	16:30			0	0	901	1	1
10 START	08:30		8-7-80	0	–	900	–	–
11	10:30			-1	-1	898.	-2	-3
12	12:30			0	1	900	0	-1
13	14:30			0	0	900	0	0
14	16:30			0	0	900	0	0
15 START	08:30		8-8-80	0	–	900	–	–
16	10:30			2	2	898	-2	-4
17	12:30			2	0	900	2	0
18	14:30			2	0	900	0	0
19								
20								

Zero Drift = [Mean Zero Drift* .429 + CI (Zero) .885] ÷ [Span] x 100 = .865 .

Calibration Drift = [Mean Span Drift* .857 + CI (Span) .843] ÷ [Span] x 100 = .17[illegible] .

*Absolute Value.

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KVB

Engineer H. Byerri

MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

NO INSTRUMENT · TECO SERIES 10

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)
8-5-80 08:30	0	—	234	—
8-6-80 0830	-2	-2	233	-1
8-7-80 08:30	+2	+2	235	+2
8-8-80 08 30	-4	-4	233	-2
8-11-80 08 30	0	—	234	—
8-12-80 08:30	-5	-5	230	-4
8-13-80 08 30	-2	+2	234	+4
8-14-80 08 30	0	0	238	+4
8-15-80 08:30	0	0	234	0

Zero Drift = [Mean Zero Drift* 2.142 + C.I. (Zero) 1.728]

÷ [Instrument Span] x 100 = 1.548.

Calibration Drift = [Mean Span Drift* 2.429 + C.I. (Span) 1.500]

÷ [Instrument Span] x 100 = 1.572.

*Absolute Value

SP. = 250

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KVB

Engineer H Browning

MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

CO_2 Instrument - Horiba PIR 2000

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)
8-5-80 08:30	0	—	17.8 %	—
8-6-80 08:30	0	0	17.8 %	0
8-7-80 08:30	0	0	17.8 %	0
8-8-80 08:30	0	0	17.8 %	0
8-11-80 08:30	0	—	17.8 %	—
8-12-80 08:30	0	0	17.8 %	0
8-13-80 08:30	0	0	17.8 %	0
8-14-80 08:30	0	0	17.8 %	0
8-15-80 08:30	0	0	18.0	+.2

Zero Drift = [Mean Zero Drift* 0 + C.I. (Zero) 0]

÷ [Instrument Span] x 100 = 0 .

Calibration Drift = [Mean Span Drift* .020 + C.I. (Span) .070]

÷ [Instrument Span] x 100 = .450 % .

*Absolute Value

Span = 20

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KVB

Engineer H. Buening

MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

O_2 Instrument
Beckman - 7003

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)
8-5-80 08:30	DNA	DNA	9.27	–
8-6-80 08:30	↓	↓	9.27	0
8-7-80 08:30			9.20	-.07
8-8-80 08:30			9.20	-.07
8-11-80 08:30			9.27	–
8-12-80 08:30			9.20	-.07
8-13-80 08:30			9.27	0
8-14-80 08:30			9.00	-.27
8-15-80 08:30	↓	↓	9.27	0

Zero Drift = [Mean Zero Drift* – + C.I. (Zero) –]
÷ [Instrument Span] x 100 = – .

Calibration Drift = [Mean Span Drift* .069 + C.I. (Span) .089]
÷ [Instrument Span] x 100 = 0.632%

*Absolute Value

span = 25%

KVB

Engineer H Buening

MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

CO INSTRUMENT - HORIBA PIR 2000

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)
8-5-80 0830	0	—	900	—
8-6-80 0830	0	0	901	+1
8-7-80 0830	-2	-2	902	-1
8-8-80 0830	-2	-2	900	-2
8-11-80 0830	0	—	900	—
8-12-80 0830	0	0	902	+2
8-13-80 0830	0	0	900	-2
8-14-80 0830	-2	-2	900	0
8-15-80 0830	-2	-2	900	0

Zero Drift = [Mean Zero Drift* 1.14 + C.I. (Zero) .990]
÷ [Instrument Span] x 100 = .213 %.

Calibration Drift = [Mean Span Drift* 1.14 + C.I. (Span) 0.95]
÷ [Instrument Span] x 100 = .219 %

*Absolute Value

SPAN = 1000

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KVB

Engineer
3-4-80

MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

Calibration Gas Mixture Data

Mid (50%) 120 ppm High (90%) 234 ppm

NO - Analyzer - Teco Series 10

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences[1], ppm
1 0	0	0	0
2 M	120	120	0
3 0	0	0	0
4 H	234	235	+1
5 M	120	119	-1
6 H	234	235	+1
7 M	120	120	0
8 0	0	0	0
9 M	120	119	-1
10 0	0	0	0
11 H	234	234	0
12 M	120	120	0
13 H	234	235	+1
14 0	0	0	0
15 H	234	234	0

Reading on 0-250 ppm range

	Mid	High
Mean difference	[illegible]	[illegible]
Confidence interval	+.01	+
Calibration error = $\frac{\text{Mean Difference}^{2} + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	[illegible] %	[illegible] %

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

KVB

Engineer K.
8-4-80

MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

Calibration Gas Mixture Data

Mid (50%) 10.0 ppm %   High (90%) 17.8 ppm %

CO_2 Analyzer - Horiba PIR-2000

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences,[1] ppm
1 O	0	0	0
2 M	10	10	0
3 O	0	0	0
4 H	17.8	17.8	0
5 M	10	10	0
6 H	17.8	17.8	0
7 M	10	10	0
8 O	0	0	0
9 M	10	10	0
10 O	0	0	0
11 H	17.8	17.8	0
12 M	10	10	0
13 H	17.8	17.8	0
14 O	0	0	0
15 H	17.8	17.8	0

Reading on 0-20 scale.

	Mid	High
Mean difference	0	0
Confidence interval	+ 0	+ 0
Calibration error = $\frac{\text{Mean Difference[2]} + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	0 %	0 %

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

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KVB

Engineer K.
8-4-80

MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

Calibration Gas Mixture Data

Mid (50%) 5.0 ~~ppm~~ % High (90%) 9.3 ~~ppm~~ %

Oxygen Analyzer - Beckman Model 7003

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences[1], ppm
1 O	No zero adjustment on analyzer		–
2 M	5.0	5.0	0
3 O	DNA	–	–
4 H	9.3	9.1	-0.2
5 M	5.0	5.0	0
6 H	9.3	9.1	-0.2
7 M	5.0	4.9	-0.1
8 O	DNA	–	–
9 M	5.0	5.0	0
10 O	DNA	–	–
11 H	9.3	9.0	-0.3
12 M	5.0	5.0	0
13 H	9.3	9.1	-0.2
14 O	DNA	–	–
15 H	9.3	9.1	-0.2

Reading on 0-10 scale

	Mid	High
Mean difference	.02	.22
Confidence interval	+.06	+.06
Calibration error = $\frac{\text{Mean Difference}^2 + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	[illegible] %	3.0 %

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

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KVB

Engineer H. Buening
8-4-80

MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

Calibration Gas Mixture Data

Mid (50%) 500 ppm High (90%) 900 ppm

CO ANALYZER - HORIBA PIR 2000

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences[1], ppm
1 O	0	0	0
2 M	500	492	-8
3 O	0	0	0
4 H	900	900	0
5 M	500	492	-8
6 H	900	900	0
7 M	500	492	-8
8 O	0	0	0
9 M	500	492	-8
10 O	0	0	0
11 H	900	900	0
12 M	500	492	-8
13 H	900	900	0
14 O	0	0	0
15 H	900	900	0

Reading on 0-1000 ppm scale

	Mid	High
Mean difference	8	
Confidence interval	+ 0	+ 0
Calibration error = $\frac{\text{Mean Difference}^2 + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	[illegible] %	0 %

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

KVB

MONITOR PERFORMANCE TEST DATA SHEET

ACCURACY DETERMINATION (NO_x)

Engineer H. Burning

Test No.	Date and Time	Reference Method Samples				Analyzer 1-Hour Average (ppm)*		Difference (ppm)	
		NO_x Sample 1 (ppm)	NO_x Sample 2 (ppm)	NO_x Sample 3 (ppm)	NO_x Sample Average (ppm)		NO_x		NO_x
		@ 3% O_2, dry	@ 3% O_2, dry	@ 3% O_2, dry	@ 3% O_2, dry	@ 3% O_2, dry		@ 3% O_2, dry	
1	8-7-80 8:55	70	94	88	84		67		17
2	8-7-80 9:55	80	89	79	83		67		16
3	8-7-80 10:55	79	67	73	73		63		10
4	8-7-80 11:55	73	71	73	72		70		2
5	8-7-80 12:55	69	65	69	68		58		10
6	8-7-80 13:55	64	73	67	68		60		8
7	8-7-80 14:55	69	75	70	71		66		5
8	8-7-80 15:55	73	Air Leak	72	73		61		12
9	8-7-80 16:55	59	75	72	69		58		11

Mean reference method test value (NO_x) 73

Mean of the differences 10

95% Confidence intervals = ± 3.68 ppm (NO_x)

$$\text{Accuracies} = \frac{\text{Mean of the differences + 95\% confidence interval}}{\text{Mean reference method value}} \times 100 = 18.7\ \%\ (NO_x)$$

* Explain and report method used to determine integrated averages

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MONITOR PERFORMANCE TEST DATA SHEET

ACCURACY DETERMINATION (NO_x)

Engineer H. Svenning

Test No.	Date and Time	Reference Method Samples				Analyzer 1-Hour Average (ppm)* NO_x		Difference (ppm) NO_x	
		NO_x Sample 1 (ppm)	NO_x Sample 2 (ppm)	NO_x Sample 3 (ppm)	NO_x Sample Average (ppm)				
1	9-11-80 8:30	64	85	84	78		76		2
2	9-11-80 9:30	55	90	69	71		58		13
3	9-11-80 10:30	67	86	83	79		59		20
4	9-11-80 11:30	73	75	73	74		63		11
5	9-11-80 12:30	82	72	86	80		77		3
6	9-11-80 13:30	65	74	72	70		67		3
7	9-11-80 14:30	63	79	80	74		68		6
8	9-11-80 15:30	76	79	88	81		65		16
9	9-11-80 16:30	86	AIR LEAK	AIR LEAK	86		74		8

Mean reference method test value (NO_x) 7.7

Mean of the differences 9.11

95% Confidence intervals = ± 4.9 ppm (NO_x)

Accuracies = $\frac{\text{Mean of the differences + 95\% confidence interval}}{\text{Mean reference method value}}$ x 100 = 18.2 % (NO_x)

* Explain and report method used to determine integrated averages

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APPENDIX D

CONTINUOUS MONITOR PERFORMANCE SPECIFICATIONS

PERFORMANCE SPECIFICATION 2—PERFORMANCE SPECIFICATIONS AND SPECIFICATION TEST PROCEDURES FOR MONITORS OF SO_2 AND NO_x FROM STATIONARY SOURCES

1. Principle and Applicability.

1.1 Principle. The concentration of sulfur dioxide or oxides of nitrogen pollutants in stack emissions is measured by a continuously operating emission measurement system. Concurrent with operation of the continuous monitoring system, the pollutant concentrations are also measured with reference methods (Appendix A). An average of the continuous monitoring system data is computed for each reference method testing period and compared to determine the relative accuracy of the continuous monitoring system. Other tests of the continuous monitoring system are also performed to determine calibration error, drift, and response characteristics of the system.

1.2 Applicability. This performance specification is applicable to evaluation of continuous monitoring systems for measurement of nitrogen oxides or sulfur dioxide pollutants. These specifications contain test procedures, installation requirements, and data computation procedures for evaluating the acceptability of the continuous monitoring systems.

2. Apparatus.

2.1 Calibration Gas Mixtures. Mixtures of known concentrations of pollutant gas in a diluent gas shall be prepared. The pollutant gas shall be sulfur dioxide or the appropriate oxide(s) of nitrogen specified by paragraph 6 and within subparts. For sulfur dioxide gas mixtures, the diluent gas may be air or nitrogen. For nitric oxide (NO) gas mixtures, the diluent gas shall be oxygen-free (<10 ppm) nitrogen, and for nitrogen dioxide (NO_2) gas mixtures the diluent gas shall be air. Concentrations of approximately 50 percent and 90 percent of span are required. The 90 percent gas mixture is used to set and to check the span and is referred to as the span gas.

2.2 Zero Gas. A gas certified by the manufacturer to contain less than 1 ppm of the pollutant gas or ambient air may be used.

2.3 Equipment for measurement of the pollutant gas concentration using the reference method specified in the applicable standard.

2.4 Data Recorder. Analog chart recorder or other suitable device with input voltage range compatible with analyzer system output. The resolution of the recorder's data output shall be sufficient to allow completion of the test procedures within this specification.

2.5 Continuous monitoring system for SO_2 or NO_x pollutants as applicable.

3. Definitions.

3.1 Continuous Monitoring System. The total equipment required for the determination of a pollutant gas concentration in a source effluent. Continuous monitoring systems consist of major subsystems as follows:

3.1.1 Sampling Interface. That portion of an extractive continuous monitoring system that performs one or more of the following operations: Acquisition, transportation, and conditioning of a sample of the source effluent or that portion of an in-situ continuous monitoring system that protects the analyzer from the effluent.

3.1.2 Analyzer. That portion of the continuous monitoring system which senses the pollutant gas and generates a signal output that is a function of the pollutant concentration.

3.1.3 Data Recorder. That portion of the continuous monitoring system that provides a permanent record of the output signal in terms of concentration units.

3.2 Span. The value of pollutant concentration at which the continuous monitoring system is set to produce the maximum data display output. The span shall be set at the concentration specified in each applicable subpart.

3.3 Accuracy (Relative). The degree of correctness with which the continuous monitoring system yields the value of gas concentration of a sample relative to the value given by a defined reference method. This accuracy is expressed in terms of error, which is the difference between the paired concentration measurements expressed as a percentage of the mean reference value.

3.4 Calibration Error. The difference between the pollutant concentration indicated by the continuous monitoring system and the known concentration of the test gas mixture.

3.5 Zero Drift. The change in the continuous monitoring system output over a stated period of time of normal continuous operation when the pollutant concentration at the time for the measurements is zero.

3.6 Calibration Drift. The change in the continuous monitoring system output over a stated time period of normal continuous operations when the pollutant concentration at the time of the measurements is the same known upscale value.

3.7 Response Time. The time interval from a step change in pollutant concentration at the input to the continuous monitoring system to the time at which 95 percent of the corresponding final value is reached as displayed on the continuous monitoring system data recorder.

3.8 Operational Period. A minimum period of time over which a measurement system is expected to operate within certain performance specifications without unscheduled maintenance, repair, or adjustment.

3.9 Stratification. A condition identified by a difference in excess of 10 percent between the average concentration in the duct or stack and the concentration at any point more than 1.0 meter from the duct or stack wall.

4. Installation Specifications. Pollutant continuous monitoring systems (SO_2 and NO_x) shall be installed at a sampling location where measurements can be made which are directly representative (4.1), or which can be corrected so as to be representative (4.2) of the total emissions from the affected

facility. Conformance with this requirement shall be accomplished as follows:

4.1 Effluent gases may be assumed to be nonstratified if a sampling location eight or more stack diameters (equivalent diameters) downstream of any air in-leakage is selected. This assumption and data correction procedures under paragraph 4.2.1 may not be applied to sampling locations upstream of an air preheater in a steam generating facility under Subpart D of this part. For sampling locations where effluent gases are either demonstrated (4.3) or may be assumed to be nonstratified (eight diameters), a point (extractive systems) or path (in-situ systems) of average concentration may be monitored.

4.2 For sampling locations where effluent gases cannot be assumed to be nonstratified (less than eight diameters) or have been shown under paragraph 4.3 to be stratified, results obtained must be consistently representative (e.g. a point of average concentration may shift with load changes) or the data generated by sampling at a point (extractive systems) or across a path (in-situ systems) must be corrected (4.2.1 and 4.2.2) so as to be representative of the total emissions from the affected facility. Conformance with this requirement may be accomplished in either of the following ways:

4.2.1 Installation of a diluent continuous monitoring system (O_2 or CO_2 as applicable) in accordance with the procedures under paragraph 4.2 of Performance Specification 3 of this appendix. If the pollutant and diluent monitoring systems are not of the same type (both extractive or both in-situ), the extractive system must use a multipoint probe.

4.2.2 Installation of extractive pollutant monitoring systems using multipoint sampling probes or in-situ pollutant monitoring systems that sample or view emissions which are consistently representative of the total emissions for the entire cross section. The Administrator may require data to be submitted to demonstrate that the emissions sampled or viewed are consistently representative for several typical facility process operating conditions.

4.3 The owner or operator may perform a traverse to characterize any stratification of effluent gases that might exist in a stack or duct. If no stratification is present, sampling procedures under paragraph 4.1 may be applied even though the eight diameter criteria is not met.

4.4 When single point sampling probes for extractive systems are installed within the stack or duct under paragraphs 4.1 and 4.2.1, the sample may not be extracted at any point less than 1.0 meter from the stack or duct wall. Multipoint sampling probes installed under paragraph 4.2.2 may be located at any points necessary to obtain consistently representative samples.

5. Continuous Monitoring System Performance Specifications.

The continuous monitoring system shall meet the performance specifications in Table 2-1 to be considered acceptable under this method.

TABLE 2-1.—*Performance specifications*

Parameter	*Specification*
1. Accuracy[1]	≤20 pct of the mean value of the reference method test data.
2. Calibration error[1]	≤5 pct of each (50 pct, 90 pct) calibration gas mixture value.
3. Zero drift (2 h)[1]	2 pct of span
4. Zero drift (24 h)[1]	Do.
5. Calibration drift (2 h)[1]	Do.
6. Calibration drift (24 h)[1]	2.5 pct. of span
7. Response time	15 min maximum.
8. Operational period	168 h minimum.

[1] Expressed as sum of absolute mean value plus 95 pct confidence interval of a series of tests.

6. Performance Specification Test Procedures. The following test procedures shall be used to determine conformance with the requirements of paragraph 5. For NO_x analyzers that oxidize nitric oxide (NO) to nitrogen dioxide (NO_2), the response time test under paragraph 6.3 of this method shall be performed using nitric oxide (NO) span gas. Other tests for NO_x continuous monitoring systems under paragraphs 6.1 and 6.2 and all tests for sulfur dioxide systems shall be performed using the pollutant span gas specified by each subpart.

6.1 Calibration Error Test Procedure. Set up and calibrate the complete continuous monitoring system according to the manufacturer's written instructions. This may be accomplished either in the laboratory or in the field.

6.1.1 Calibration Gas Analyses. Triplicate analyses of the gas mixtures shall be performed within two weeks prior to use using Reference Methods 6 for SO_2 and 7 for NO_x. Analyze each calibration gas mixture (50%, 90%) and record the results on the example sheet shown in Figure 2-1. Each sample test result must be within 20 percent of the averaged result or the tests shall be repeated. This step may be omitted for non-extractive monitors where dynamic calibration gas mixtures are not used (6.1.2).

6.1.2 Calibration Error Test Procedure. Make a total of 15 nonconsecutive measurements by alternately using zero gas and each calibration gas mixture concentration (e.g. 0%, 50%, 0%, 90%, 50%, 90%, 50%, 0%, etc.). ~~For nonextractive continuous monitoring systems this test procedure may be performed by using two or more calibration gas~~

cells whose concentrations are certified by the manufacturer to be functionally equivalent to these gas concentrations. Convert the continuous monitoring system output readings to ppm and record the results on the example sheet shown in Figure 2-2.

6.2 Field Test for Accuracy (Relative), Zero Drift, and Calibration Drift. Install and operate the continuous monitoring system in accordance with the manufacturer's written instructions and drawings as follows:

6.2.1 Conditioning Period. Offset the zero setting at least 10 percent of the span so that negative zero drift can be quantified. Operate the system for an initial 168-hour conditioning period in normal operating manner.

6.2.2 Operational Test Period. Operate the continuous monitoring system for an additional 168-hour period retaining the zero offset. The system shall monitor the source effluent at all times except when being zeroed, calibrated, or backpurged.

6.2.2.1 Field Test for Accuracy (Relative). For continuous monitoring systems employing extractive sampling, the probe tip for the continuous monitoring system and the probe tip for the Reference Method sampling train should be placed at adjacent locations in the duct. For NO_x continuous monitoring systems, make 27 NO_x concentration measurements, divided into nine sets, using the applicable reference method. No more than one set of tests, consisting of three individual measurements, shall be performed in any one hour. All individual measurements of each set shall be performed concurrently, or within a three-minute interval and the results averaged. For SO_2 continuous monitoring systems, make nine SO_2 concentration measurements using the applicable reference method. No more than one measurement shall be performed in any one hour. Record the reference method test data and the continuous monitoring system concentrations on the example data sheet shown in Figure 2-3.

6.2.2.2 Field Test for Zero Drift and Calibration Drift. For extractive systems, determine the values given by zero and span gas pollutant concentrations at two-hour intervals until 15 sets of data are obtained. For nonextractive measurement systems, the zero value may be determined by mechanically producing a zero condition that provides a system check of the analyzer internal mirrors and all electronic circuitry including the radiation source and detector assembly or by inserting three or more calibration gas cells and computing the zero point from the upscale measurements. If this latter technique is used, a graph(s) must be retained by the owner or operator for each measurement system that shows the relationship between the upscale measurements and the zero point. The span of the system shall be checked by using a calibration gas cell certified by the manufacturer to be functionally equivalent to 60 percent of span concentration. Record the zero and span measurements (or the computed zero drift) on the example data sheet shown in Figure 2-4. The two-hour periods over which measurements are conducted need not be consecutive but may not overlap. All measurements required under this paragraph may be conducted concurrent with tests under paragraph 6.2.2.1.

6.2.2.3 Adjustments. Zero and calibration corrections and adjustments are allowed only at 24-hour intervals or at such shorter intervals as the manufacturer's written instructions specify. Automatic corrections made by the measurement system without operator intervention or initiation are allowable at any time. During the entire 168-hour operational test period, record on the example sheet shown in Figure 2-5 the values given by zero and span gas pollutant concentrations before and after adjustment at 24-hour intervals.

6.3 Field Test for Response Time.

6.3.1 Scope of Test. Use the entire continuous monitoring system as installed, including sample transport lines if used. Flow rates, line diameters, pumping rates, pressures (do not allow the pressurized calibration gas to change the normal operating pressure in the sample line), etc., shall be at the nominal values for normal operation as specified in the manufacturer's written instructions. If the analyzer is used to sample more than one pollutant source (stack), repeat this test for each sampling point.

6.3.2 Response Time Test Procedure. Introduce zero gas into the continuous monitoring system sampling interface or as close to the sampling interface as possible. When the system output reading has stabilized, switch quickly to a known concentration of pollutant gas. Record the time from concentration switching to 95 percent of final stable response. For non-extractive monitors, the highest available calibration gas concentration shall be switched into and out of the sample path and response times recorded. Perform this test sequence three (3) times. Record the results of each test on the example sheet shown in Figure 2-6.

7. Calculations, Data Analysis and Reporting.

7.1 Procedure for determination of mean values and confidence intervals.

7.1.1 The mean value of a data set is calculated according to equation 2-1.

$$\bar{x}=\frac{1}{n}\sum_{i=1}^{n}x_i \qquad \text{Equation 2-1}$$

where:

x_i = absolute value of the measurements,
Σ = sum of the individual values,
$\bar{x}$ = mean value, and
n = number of data points.

7.1.2 The 95 percent confidence interval (two-sided) is calculated according to equation 2-2:

$$C.I._{95}=\frac{t_{.975}}{n\sqrt{n-1}}\sqrt{n(\Sigma x_i^2)-(\Sigma x_i)^2} \qquad \text{Equation 2-2}$$

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where:

$\sum x_i$ = sum of all data points,

$t_{.975} = t_1 - \alpha/2$, and

$C.I._{95}$ = 95 percent confidence interval estimate of the average mean value.

Values for $t_{.975}$

n	$t_{.975}$
2	12.706
3	4.303
4	3.182
5	2.776
6	2.571
7	2.447
8	2.365
9	2.306
10	2.262
11	2.228
12	2.201
13	2.179
14	2.160
15	2.145
16	2.131

The values in this table are already corrected for n-1 degrees of freedom. Use n equal to the number of samples as data points.

7.2 Data Analysis and Reporting.

7.2.1 Accuracy (Relative). For each of the nine reference method test points, determine the average pollutant concentration reported by the continuous monitoring system. These average concentrations shall be determined from the continuous monitoring system data recorded under 7.2.2 by integrating or averaging the pollutant concentrations over each of the time intervals concurrent with each reference method testing period. Before proceeding to the next step, determine the basis (wet or dry) of the continuous monitoring system data and reference method test data concentrations. If the bases are not consistent, apply a moisture correction to either reference method concentrations or the continuous monitoring system concentrations as appropriate. Determine the correction factor by moisture tests concurrent with the reference method testing periods. Report the moisture test method and the correction procedure employed. For each of the nine test runs determine the difference for each test run by subtracting the respective reference method test concentrations (use average of each set of three measurements for NO_x) from the continuous monitoring system integrated or averaged concentrations. Using these data, compute the mean difference and the 95 percent confidence interval of the differences (equations 2-1 and 2-2). Accuracy is reported as the sum of the absolute value of the mean difference and the 95 percent confidence interval of the differences expressed as a percentage of the mean reference method value. Use the example sheet shown in Figure 2-3.

7.2.2 Calibration Error. Using the data from paragraph 6.1, subtract the measured pollutant concentration determined under paragraph 6.1.1 (Figure 2-1) from the value shown by the continuous monitoring system for each of the five readings at each concentration measured under 6.1.2 (Figure 2-2). Calculate the mean of these difference values and the 95 percent confidence intervals according to equations 2-1 and 2-2. Report the calibration error (the sum of the absolute value of the mean difference and the 95 percent confidence interval) as a percentage of each respective calibration gas concentration. Use example sheet shown in Figure 2-2.

7.2.3 Zero Drift (2-hour). Using the zero concentration values measured each two hours during the field test, calculate the differences between consecutive two-hour readings expressed in ppm. Calculate the mean difference and the confidence interval using equations 2-1 and 2-2. Report the zero drift as the sum of the absolute mean value and the confidence interval as a percentage of span. Use example sheet shown in Figure 2-4.

7.2.4 Zero Drift (24-hour). Using the zero concentration values measured every 24 hours during the field test, calculate the differences between the zero point after zero adjustment and the zero value 24 hours later just prior to zero adjustment. Calculate the mean value of these points and the confidence interval using equations 2-1 and 2-2. Report the zero drift (the sum of the absolute mean and confidence interval) as a percentage of span. Use example sheet shown in Figure 2-5.

7.2.5 Calibration Drift (2-hour). Using the calibration values obtained at two-hour intervals during the field test, calculate the differences between consecutive two-hour readings expressed as ppm. These values should be corrected for the corresponding zero drift during that two-hour period. Calculate the mean and confidence interval of these corrected difference values using equations 2-1 and 2-2. Do not use the differences between non-consecutive readings. Report the calibration drift as the sum of the absolute mean and confidence interval as a percentage of span. Use example sheet shown in Figure 2-4.

7.2.6 Calibration Drift (24-hour). Using the calibration values measured every 24 hours during the field test, calculate the differences between the calibration concentration reading after zero and calibration adjustment, and the calibration concentration reading 24 hours later after zero adjustment but before calibration adjustment. Calculate the mean value of these differences and the confidence interval using equations 2-1 and 2-2. Report the calibration drift (the sum of the absolute mean and confidence interval) as a percentage of span. Use the example sheet shown in Figure 2-5.

7.2.7 Response Time. Using the charts from paragraph 6.3, calculate the time interval from concentration switching to 95 percent to the final stable value for all upscale and downscale tests. Report the mean of the three upscale test times and the mean of the three downscale test times. The two average times should not differ by more than 15 percent of the slower time. Report the slower time as the system response time. Use the example sheet shown in Figure 2-6.

7.2.8 Operational Test Period. During the 168-hour performance and operational test period, the continuous monitoring system shall not require any corrective maintenance, repair, replacement, or adjustment other than that clearly specified as required in the operation and maintenance manuals as routine and expected during a one-week period. If the continuous monitoring system operates within the specified performance parameters and does not require corrective maintenance, repair, replacement or adjustment other than as specified above during the 168-hour test period, the operational period will be successfully concluded. Failure of the continuous monitoring system to meet this requirement shall call for a repetition of the 168-hour test period. Portions of the test which were satisfactorily completed need not be repeated. Failure to meet any performance specifications shall call for a repetition of the one-week performance test period and that portion of the testing which is related to the failed specification. All maintenance and adjustments required shall be recorded. Output readings shall be recorded before and after all adjustments.

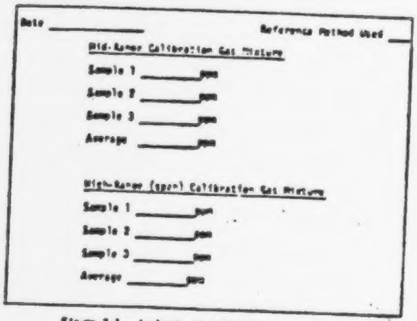
8. References.

8.1 "Monitoring Instrumentation for the Measurement of Sulfur Dioxide in Stationary Source Emissions," Environmental Protection Agency, Research Triangle Park, N.C., February 1973.

8.2 "Instrumentation for the Determination of Nitrogen Oxides Content of Stationary Source Emissions," Environmental Protection Agency, Research Triangle Park, N.C., Volume 1, APTD-0847, October 1971; Volume 2, APTD-0942, January 1972.

8.3 "Experimental Statistics," Department of Commerce, Handbook 91, 1963, pp. 3-31, paragraphs 3-3.1.4.

8.4 "Performance Specifications for Stationary-Source Monitoring Systems for Gases and Visible Emissions," Environmental Protection Agency, Research Triangle Park, N.C., EPA-650/2-74-013, January 1974.



Date ________ Reference Method Used ____

Mid-Range Calibration Gas Mixture

Sample 1 ________ppm

Sample 2 ________ppm

Sample 3 ________ppm

Average ________ppm

High-Range (span) Calibration Gas Mixture

Sample 1 ________ppm

Sample 2 ________ppm

Sample 3 ________ppm

Average ________ppm

Figure 2-1. Analysis of Calibration Gas Mixtures

Manual Performance Test Data Sheet

Calibration Gas Mixture Data (From Figure 2-1)

Mid (50%) _____ppm High (90%) _____ppm

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences,[1] ppm
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

	Mid	High
Mean difference	_____	_____
Confidence interval	± _____	± _____
Calibration error = $\frac{\text{Mean Difference}^{2} + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	_____%	_____%

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

Figure 2-2. Calibration Error Determination

Test No.	Date and Time	Reference Method Samples					Analyzer 1-Hour Average (ppm)*		Difference (ppm)	
		SO_2 Sample 1 (ppm)	NO_x Sample 1 (ppm)	NO_x Sample 2 (ppm)	NO_x Sample 3 (ppm)	NO_x Sample Average (ppm)	SO_2	NO_x	SO_2	NO_x
1										
2										
3										
4										
5										
6										
7										
8										
9										

Mean reference method test value (SO_2) ____

Mean reference method test value (NO_x) ____

Mean of the differences ____

95% Confidence intervals = ± ____ ppm (SO_2) = ± ____ ppm (NO_x)

$$\text{Accuracies} = \frac{|\text{Mean of the differences}| + |\text{95\% confidence interval}|}{\text{Mean reference method value}} \times 100 = \_\_\_\%\ (SO_2) = \_\_\_\%\ (NO_x)$$

* Explain and report method used to determine integrated averages

Figure 2-3. Accuracy Determination (SO_2 and NO_x)

Data Set No.	Time Begin	Time End	Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span- Zero)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Zero Drift = [Mean Zero Drift* ____ + CI (Zero) ____] ÷ [Span] x 100 = ____.
Calibration Drift = [Mean Span Drift* ____ + CI (Span) ____] ÷ [Span] x 100 = ____.
*Absolute Value.

Figure 2-4. Zero and Calibration Drift (2 hour)

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After zero adjustment)	Calibration Drift (ΔSpan)

Zero Drift = [Mean Zero Drift* _______ + C.I. (Zero) _______]

÷ [Instrument Span] x 100 = _______.

Calibration Drift = [Mean Span Drift* _______ + C.I. (Span) _______]

÷ [Instrument Span] x 100 = _______.

* Absolute value

Figure 2-5. Zero and Calibration Drift (24-hour)

Date of Test ____________

Span Gas Concentration ________ppm

Analyzer Span Setting ________ppm

Upscale
1 ________seconds
2 ________seconds
3 ________seconds

Average upscale response ________seconds

Downscale
1 ________seconds
2 ________seconds
3 ________seconds

Average downscale response ________seconds

System average response time (slower time) = ________seconds.

$$\text{\%deviation from slower system average response} = \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% = \_\_\_\_.$$

CO_2 & O_2

Figure 2-6. Response Time

Performance Specification 3—Performance specifications and specification test procedures for monitors of CO_2 and O_2 from stationary sources.

1. Principle and Applicability.

1.1 Principle. Effluent gases are continuously sampled and are analyzed for carbon dioxide or oxygen by a continuous monitoring system. Tests of the system are performed during a minimum operating period to determine zero drift, calibration drift, and response time characteristics.

1.2 Applicability. This performance specification is applicable to evaluation of continuous monitoring systems for measurement of carbon dioxide or oxygen. These specifications contain test procedures, installation requirements, and data computation procedures for evaluating the acceptability of the continuous monitoring systems subject to approval by the Administrator. Sampling may include either extractive or non-extractive (in-situ) procedures.

2. Apparatus.

2.1 Continuous Monitoring System for Carbon Dioxide or Oxygen.

2.2 Calibration Gas Mixtures. Mixture of known concentrations of carbon dioxide or oxygen in nitrogen or air. Midrange and 90 percent of span carbon dioxide or oxygen concentrations are required. The 90 percent of span gas mixture is to be used to set and check the analyzer span and is referred to as span gas. For oxygen analyzers, if the span is higher than 21 percent O_2, ambient air may be used in place of the 90 percent of span calibration gas mixture. Triplicate analyses of the gas mixture (except ambient air) shall be performed within two weeks prior to use using Reference Method 3 of this part.

2.3 Zero Gas. A gas containing less than 100 ppm of carbon dioxide or oxygen.

2.4 Data Recorder. Analog chart recorder or other suitable device with input voltage range compatible with analyzer system output. The resolution of the recorder's data output shall be sufficient to allow completion of the test procedures within this specification.

3. Definitions.

3.1 Continuous Monitoring System. The total equipment required for the determination of carbon dioxide or oxygen in a given source effluent. The system consists of three major subsystems:

3.1.1 Sampling Interface. That portion of the continuous monitoring system that performs one or more of the following operations: Delineation, acquisition, transportation, and conditioning of a sample of the source effluent or protection of the analyzer from the hostile aspects of the sample or source environment.

3.1.2 Analyzer. That portion of the continuous monitoring system which senses the pollutant gas and generates a signal output that is a function of the pollutant concentration.

3.1.3 Data Recorder. That portion of the continuous monitoring system that provides a permanent record of the output signal in terms of concentration units.

3.2 Span. The value of oxygen or carbon dioxide concentration at which the continuous monitoring system is set that produces the maximum data display output. For the purposes of this method, the span shall be set no less than 1.5 to 2.5 times the normal carbon dioxide or normal oxygen concentration in the stack gas of the affected facility.

3.3 Midrange. The value of oxygen or carbon dioxide concentration that is representative of the normal conditions in the stack gas of the affected facility at typical operating rates.

3.4 Zero Drift. The change in the continuous monitoring system output over a stated period of time of normal continuous operation when the carbon dioxide or oxygen concentration at the time for the measurements is zero.

3.5 Calibration Drift. The change in the continuous monitoring system output over a stated time period of normal continuous operation when the carbon dioxide or oxygen continuous monitoring system is measuring the concentration of span gas.

3.6 Operational Test Period. A minimum period of time over which the continuous monitoring system is expected to operate within certain performance specifications without unscheduled maintenance, repair, or adjustment.

3.7 Response time. The time interval from a step change in concentration at the input to the continuous monitoring system to the time at which 95 percent of the corresponding final value is displayed on the continuous monitoring system data recorder.

4. Installation Specification.

Oxygen or carbon dioxide continuous monitoring systems shall be installed at a location where measurements are directly representative of the total effluent from the affected facility or representative of the same effluent sampled by a SO_2 or NO_x continuous monitoring system. This requirement shall be complied with by use of applicable requirements in Performance Specification 2 of this appendix as follows:

4.1 Installation of Oxygen or Carbon Dioxide Continuous Monitoring Systems Not Used to Convert Pollutant Data. A sampling location shall be selected in accordance with the procedures under paragraphs 4.2.1 or 4.2.2, or Performance Specification 2 of this appendix.

4.2 Installation of Oxygen or Carbon Dioxide Continuous Monitoring Systems Used to Convert Pollutant Continuous Monitoring System Data to Units of Applicable Standards. The diluent continuous monitoring system (oxygen or carbon dioxide) shall be installed at a sampling location where measurements that can be made are representative of the effluent gases sampled by the pollutant continuous monitoring system(s). Conformance with this requirement may be accomplished in any of the following ways:

4.2.1 The sampling location for the diluent system shall be near the sampling location for the pollutant continuous monitoring system such that the same approximate point(s) (extractive systems) or path (in-situ systems) in the cross section is sampled or viewed.

4.2.2 The diluent and pollutant continuous monitoring systems may be installed at different locations if the effluent gases at both sampling locations are nonstratified as determined under paragraphs 4.1 or 4.3, Performance Specification 2 of this appendix and there is no in-leakage occurring between the two sampling locations. If the effluent gases are stratified at either location, the procedures under paragraph 4.2.2, Performance Specification 2 of this appendix shall be used for installing continuous monitoring systems at that location.

5. Continuous Monitoring System Performance Specifications.

The continuous monitoring system shall meet the performance specifications in Table 3-1 to be considered acceptable under this method.

6. Performance Specification Test Procedures.

The following test procedures shall be used to determine conformance with the requirements of paragraph 4. Due to the wide variation existing in analyzer designs and principles of operation, these procedures are not applicable to all analyzers. Where this occurs, alternative procedures, subject to the approval of the Administrator, may be employed. Any such alternative procedures must fulfill the same purposes (verify response, drift, and accuracy) as the following procedures, and must clearly demonstrate conformance with specifications in Table 3-1.

6.1 Calibration Check. Establish a calibration curve for the continuous monitoring system using zero, midrange, and span concentration gas mixtures. Verify that the resultant curve of analyzer reading compared with the calibration gas value is consistent with the expected response curve as described by the analyzer manufacturer. If the expected response curve is not produced, additional calibration gas measurements shall be made, or additional steps undertaken to verify the accuracy of the response curve of the analyzer.

6.2 Field Test for Zero Drift and Calibration Drift. Install and operate the continuous monitoring system in accordance with the manufacturer's written instructions and drawings as follows:

TABLE 3-1.—*Performance specifications*

Parameter	*Specification*
1. Zero drift (2 h)[1]	$\leq$0.4 pct O_2 or CO_2.
2. Zero drift (24 h)[1]	$\leq$0.5 pct O_2 or CO_2.
3. Calibration drift (2 h)[1]	$\leq$0.4 pct O_2 or CO_2.
4. Calibration drift (24 h)[1]	$\leq$0.5 pct O_2 or CO_2.
5. Operational period	168 h minimum.
6. Response time	10 min.

[1] Expressed as sum of absolute mean value plus 95 pct confidence interval of a series of tests.

6.2.1 Conditioning Period. Offset the zero setting at least 10 percent of span so that negative zero drift may be quantified. Operate the continuous monitoring system for an initial 168-hour conditioning period in a normal operational manner.

6.2.2. Operational Test Period. Operate the continuous monitoring system for an additional 168-hour period maintaining the zero offset. The system shall monitor the source effluent at all times except when being zeroed, calibrated, or backpurged.

6.2.3 Field Test for Zero Drift and Calibration Drift. Determine the values given by zero and midrange gas concentrations at two-hour intervals until 15 sets of data are obtained. For non-extractive continuous monitoring systems, determine the zero value given by a mechanically produced zero condition or by computing the zero value from upscale measurements using calibrated gas cells certified by the manufacturer. The midrange checks shall be performed by using certified calibration gas cells functionally equivalent to less than 50 percent of span. Record these readings on the example sheet shown in Figure 3-1. These two-hour periods need not be consecutive but may not overlap. In-situ CO_2 or O_2 analyzers which cannot be fitted with a calibration gas cell may be calibrated by alternative procedures acceptable to the Administrator. Zero and calibration corrections and adjustments are allowed only at 24-hour intervals or at such shorter intervals as the manufacturer's written instructions specify. Automatic corrections made by the continuous monitoring system without operator intervention or initiation are allowable at any time. During the entire 168-hour test period, record the values given by zero and span gas concentrations before and after adjustment at 24-hour intervals in the example sheet shown in Figure 3-2.

6.3 Field Test for Response Time.

6.3.1 Scope of Test.

This test shall be accomplished using the continuous monitoring system as installed, including sample transport lines if used. Flow rates, line diameters, pumping rates, pressures (do not allow the pressurized calibration gas to change the normal operating pressure in the sample line), etc., shall be at the nominal values for normal operation as specified in the manufacturer's written instructions. If the analyzer is used to sample more than one source (stack), this test shall be repeated for each sampling point.

6.3.2 Response Time Test Procedure.

Introduce zero gas into the continuous monitoring system sampling interface or as close to the sampling interface as possible. When the system output reading has stabilized, switch quickly to a known concentration of gas at 90 percent of span. Record the time from concentration switching to 95 percent of final stable response. After the system response has stabilized at the upper level, switch quickly to a zero gas. Record the time from concentration switching to 95 percent of final stable response. Alternatively, for nonextractive continuous monitoring systems, the highest available calibration gas concentration shall be switched into and out of the sample path and response times recorded. Perform this test sequence three (3) times. For each test, record the results on the data sheet shown in Figure 3-3.

7. Calculations, Data Analysis, and Reporting.

7.1 Procedure for determination of mean values and confidence intervals.

7.1.1 The mean value of a data set is calculated according to equation 3-1.

$$\bar{x}=\frac{1}{n}\sum_{i=1}^{n}x_i \qquad \text{Equation 3-1}$$

where:

x_i=absolute value of the measurements,
Σ=sum of the individual values,
$\bar{x}$=mean value, and
n=number of data points.

7.2.1 The 95 percent confidence interval (two-sided) is calculated according to equation 3-2:

$$C.I._{95}=\frac{t_{.975}}{n\sqrt{n-1}}\sqrt{n(\sum x_i^2)-(\sum x_i)^2} \qquad \text{Equation 3-2}$$

where:

ΣX=sum of all data points,
$t_{.975}=t_{1}-\alpha/2$, and
$C.I._{95}$=95 percent confidence interval estimates of the average mean value.

Values for $t_{.975}$

n	$t_{.975}$
2	12.706
3	4.303
4	3.182
5	2.776
6	2.571
7	2.447
8	2.365
9	2.306
10	2.262
11	2.228
12	2.201
13	2.179
14	2.160
15	2.145
16	2.131

The values in this table are already corrected for n-1 degrees of freedom. Use n equal to the number of samples as data points.

7.2 Data Analysis and Reporting.

7.2.1 Zero Drift (2-hour). Using the zero concentration values measured each two hours during the field test, calculate the differences between the consecutive two-hour readings expressed in ppm. Calculate the mean difference and the confidence interval using equations 3-1 and 3-2. Record the sum of the absolute mean value and the confidence interval on the data sheet shown in Figure 3-1.

7.2.2 Zero Drift (24-hour). Using the zero concentration values measured every 24 hours during the field test, calculate the differences between the zero point after zero adjustment and the zero value 24 hours later just prior to zero adjustment. Calculate the mean value of these points and the confidence interval using equations 3-1 and 3-2. Record the zero drift (the sum of the absolute mean and confidence interval) on the data sheet shown in Figure 3-2.

7.2.3 Calibration Drift (2-hour). Using the calibration values obtained at two-hour intervals during the field test, calculate the differences between consecutive two-hour readings expressed as ppm. These values should be corrected for the corresponding zero drift during that two-hour period. Calculate the mean and confidence interval of these corrected difference values using equations 3-1 and 3-2. Do not use the differences between non-consecutive readings. Record the sum of the absolute mean and confidence interval upon the data sheet shown in Figure 3-1.

7.2.4 Calibration Drift (24-hour). Using the calibration values measured every 24 hours during the field test, calculate the differences between the calibration concentration reading after zero and calibration adjustment and the calibration concentration reading 24 hours later after zero adjustment but before calibration adjustment. Calculate the mean value of these differences and the confidence interval using equations 3-1 and 3-2. Record the sum of the absolute mean and confidence interval on the data sheet shown in Figure 3-2.

7.2.5 Operational Test Period. During the 168-hour performance and operational test period, the continuous monitoring system shall not receive any corrective maintenance, repair, replacement, or adjustment other than that clearly specified as required in the manufacturer's written operation and maintenance manuals as routine and expected during a one-week period. If the continuous monitoring system operates within the specified performance parameters and does not require corrective maintenance, repair, replacement or adjustment other than as specified above during the 168-hour test period, the operational period will be successfully concluded. Failure of the continuous monitoring system to meet this requirement shall call for a repetition of the 168 hour test period. Portions of the test which were satisfactorily completed need not be repeated. Failure to meet any performance specifications shall call for a repetition of the one-week performance test period and that portion of the testing which is related to the failed specification. All maintenance and adjustments required shall be recorded. Output readings shall be recorded before and after all adjustments.

7.2.6 Response Time. Using the data developed under paragraph 6.3, calculate the time interval from concentration switching to 95 percent to the final stable value for all upscale and downscale tests. Report the mean of the three upscale test times and the mean of the three downscale test times. The two average times should not differ by more than 15 percent of the slower time. Report the slower time as the system response time. Record the results on Figure 3-3.

8. References.

8.1 "Performance Specifications for Stationary Source Monitoring Systems for Gases and Visible Emissions," Environmental Protection Agency, Research Triangle Park, N.C., EPA-650/2-74-013, January 1974.

8.2 "Experimental Statistics," Department of Commerce, National Bureau of Standards Handbook 91, 1963, pp. 3-31, paragraphs 3-3.1.4.

Data Set No.	Time Begin	Time End	Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift [ΔSpan-ΔZero)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Zero Drift = [Mean Zero Drift* ______ + CI (Zero) ______] = ______.

Calibration Drift = [Mean Span Drift* ______ + CI (Span ______] = ______.

*Absolute Value.

Figure 3-1. Zero and Calibration Drift (2 Hour).

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After zero adjustment)	Calibration Drift (ΔSpan)

Zero Drift = [Mean Zero Drift* _______ + C.I. (Zero) _______]

= ________.

Calibration Drift = [Mean Span Drift* ________ + C.I. (Span) ________]

= ________.

* Absolute value

Figure 3-2. Zero and Calibration Drift (24-hour)

Date of Test ____________

Span Gas Concentration __________ ppm

Analyzer Span Setting __________ ppm

Upscale
1. __________ seconds
2. __________ seconds
3. __________ seconds

Average upscale response __________ seconds

Downscale
1. __________ seconds
2. __________ seconds
3. __________ seconds

Average downscale response __________ seconds

System average response time (slower time) = __________ seconds

% deviation from slower system average response = $\frac{\text{average upscale minus average downscale}}{\text{slower time}}$ x 100%

= ____________.

Figure 3-3. Response

[40 FR 46259, Oct. 6, 1975; 40 FR 59204, 59205, Dec. 22, 1975, as amended at 42 FR 5937, Jan. 31, 1977]

Sipl

APPENDIX C—DETERMINATION OF EMISSION RATE CHANGE

1. *Introduction.*

1.1 The following method shall be used to determine whether a physical or operational change to an existing facility resulted in an increase in the emission rate to the atmosphere. The method used is the Student's *t* test, commonly used to make inferences from small samples.

2. *Data.*

2.1 Each emission test shall consist of *n* runs (usually three) which produce *n* emission rates. Thus two sets of emission rates are generated, one before and one after the change, the two sets being of equal size.

2.2 When using manual emission tests, except as provided in § 60.8(b) of this part, the reference methods of Appendix A to this part shall be used in accordance with the procedures specified in the applicable subpart both before and after the change to obtain the data.

2.3 When using continuous monitors, the facility shall be operated as if a manual emission test were being performed. Valid data using the averaging time which would be required if a manual emission test were being conducted shall be used.

3. *Procedure.*

3.1 Subscripts *a* and *b* denote prechange and postchange respectively.

3.2 Calculate the arithmetic mean emission rate, $\bar{E}$, for each set of data using Equation 1.

$$\bar{E}=\sum_{i=1}^{n}\frac{E_i}{n}=\frac{E_1+E_2\ldots+E_n}{n} \qquad (1)$$

where:

E_i=Emission rate for the *i* th run.
n=number of runs

3.3 Calculate the sample variance, S^2, for each set of data using Equation 2.

$$S^2=\frac{\sum_{i=1}^{n}(E_i-\bar{E})^2}{n-1}=\frac{\sum_{i=1}^{n}E_i^2-\left(\sum_{i=1}^{n}E_i\right)^2\Big/n}{n-1} \qquad (2)$$

3.4 Calculate the pooled estimate, S_p, using Equation 3.

$$S_p=\left[\frac{(n_a-1)\,S_a^2+(n_b-1)\,S_b^2}{n_a+n_b-2}\right]^{1/2} \qquad (3)$$

3.5 Calculate the test statistic, *t*, using Equation 4.

APPENDIX E

RESULTS OF PREVIOUS TESTS AT SITE 6

DATA SUMMARY

Test No. 58 Location 5

Category 5 Furnace Type Fire Tube Capacity 8 k#/hr

Fuel Type Natural Gas Burner Type Ring

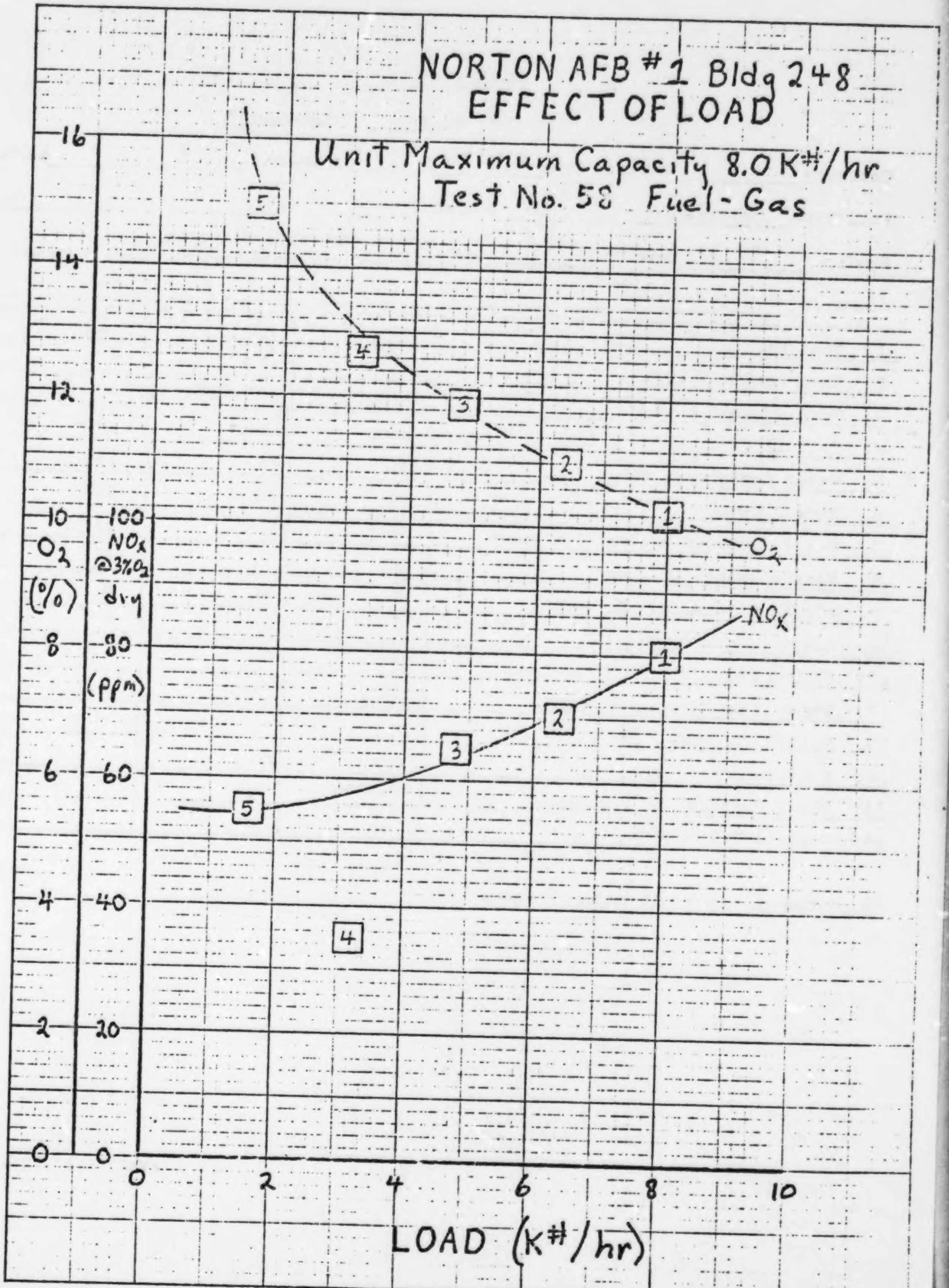
Region 9 Unit No. 248-1 Owner Norton Air Force Base, CA

Comments

1. Test No.	58-2	58-5	58-8
2. Test Load (k#/hr)	6.4	1.6	6.4
3. Type of Test	Baseline	Low Load	Low Air
4. Control	Auto	Hand	Hand
5. Water Content (% vol.)	15	15	15
6. Excess Oxygen (%)	11	15	3.2
7. Total Nitrogen Oxides[1] NOx (ppm)	70	55	45
8. Nitric Oxide[1] NO (ppm)	68	21	37
9. Nitrogen Dioxide[1] NO_2 (ppm)	2	34	8
10. Carbon Dioxide, CO_2 (%)	5	2	9
11. Carbon Monoxide, CO (ppm)	0	0	> 2000
12. Total Hydrocarbon, HC (ppm)	18	170	240
13. Sulfur Trioxide, SO_3 (ppm)	-	-	-
14. Sulfur Dioxide, SO_2 (ppm)	-	-	-
15. Total Particulate (lb/MBtu)	0.0036	-	-
16. Overall Efficiency (%)			

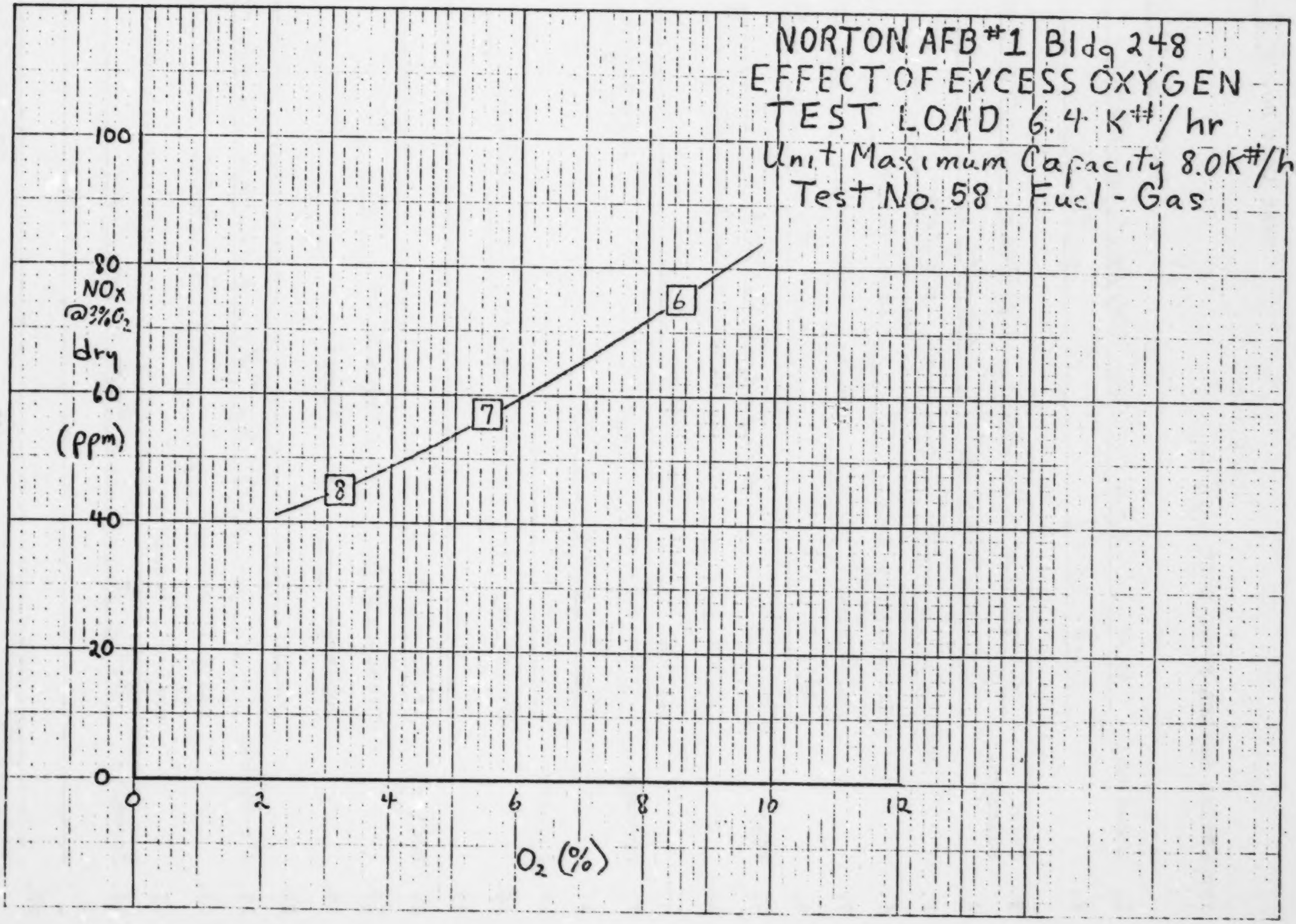
---

[1] Reported as dry at 3% excess oxygen.



K&E 10 X 10 TO THE INCH 46 0782
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.

10 X 10 TO THE INCH 46 0702
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.



Test Unit No. 58

K V B. INC.

INDUSTRIAL BOILER FIELD TEST DATA

Date 12-17-73

1. Location: Norton AFB, San Bernadino, Calif.

2. Boiler No. 1 [illegible] 19/248

3. Unit Descrptn. American Standard, Kewanee Scotch

4. Rating 6695 MBH, 200 HP

5. Size LS200 G02 Serial No. N 8664

6. Installation Date — ; Gross Output — kw

7. Firing Range ~~Heat Output~~ 8370 MBtu/hr; Steam Output 8000 lb/hr

8. Max. working press: Steam 15 PSIG Water 30 PSI

9. Fuel Oil No. 2, Gas (S. Cal. Gas Co.)

10. Amount — lb/hr Heating Surface 1000 ft²

11. Valve capacity 8000 lbs/Hr.

12. Burners Oil: Air Atomized

13. Gas: Ring

Arrangement Front

14. Furnace —

15. Overfire? — Recirculation? — Preheat? —

16.

17. Boiler Fire Tube

18. Pressure 10 to 12 psig; Temperature Sat. °F

19. Superheat — °F Reheat — °F

20.

21. Air System Const. Speed FD Fan. Air controlled by shutter

22. Control, Primary opening at Fan Inlet.

23. Control, Secondary

24. Comments Boiler Burns Gas 90% of the time.

.

26.

For Fur..er Information Please Contact:

Norman Helgeson
Glen Cato or
Carlo DeVivo at
Telephone: (714) 832-9020

Enclosure (1)

LA APCD Permit No.____________

Test No.____________

Owner/Operator

Norton Air Force Base

Person Contacted — **Date**

Charles Macy — 9/14/73

[illegible]

(1) 382 1110

Location

Mail Stop 63 ABG ρ/DE
Norton Air Force Base, California, 92409

Future Contact

Lt. Col. Richardson
Base Civil Engineer
Ext. 4993

Boiler 3 Each — Water Tube / Fire Tube

Category____________

Capacity 350HP 837[illegible] MB/H [illegible]
Firing 14,483

Date Installed____________

Product (hot water, steam) Steam [illegible]

Other (Manufacturer, Model, Spec. Features) [illegible]

LW 350 602 — American Standard

Serial 08812 — [illegible]

Sampling [illegible]

Fuel — Upthegrove Ext. 3821
382 6533

☐ Gas Only
☐ Oil Only
☐ Gas/Oil Combination

Grade

Gas____________

Oil # 2

Approximate Dates Used

Gas____________

Oil____________

OIL BURNERS — Number______ [illegible]

Atomization

☐ Mechanical
☐ Rotary
☑ Steam
☑ Air

Automatic operation

Firing rate?

Manufacturer (Date)____________

Model____________

Fuel Usage Rate (gpm)____________

Other____________

GAS BURNERS — Number______

☑ Ring
☐ Spud
☐ ____________

Manufacturer (Date)____________

Model____________

Fuel Usage Rate (SCFM)____________

Other____________

TEST SE

Sheet________of________

K V B, INC.

CONTROL ROOM DATA

T Number 58

Date 12-17-73

Unit Number Boiler # 1 BLDG 248

Owner NORTON AFB

Fuel GAS

Location SAN BERNA[illegible]

Capacity(K#/hr) 8000

Identification W.[illegible]

Furnace Type KEWANEE F.T.

Burner Type [illegible]

1. Test Number	58-1	58-2	58-3	58-4	[illegible]	
2. Load (k#/hr) %	100%	80%	60%	40%	20%	
3.						
4.						
5. Oxygen (%)						
6.						
7. Feedwater Flow (Klb/hr)	—	—	-	-		
8. Superheat Temp (°F/°C)	—	—				
9. AH Gas Temp. (°F/°C) (In/Out)	—	---				
0. FD Fan	—					
1. ID Fan	—	..				
1 Flow (lb/hr) (gal/hr)	—					
3. Air Flow	—	..				
4. Fuel Pressure (psig) [illegible]	2.0	1.25	.67	[illegible]	[illegible]	
5. Atomizing Steam Press. (psig)	—			--		
6. Steam/Water Flow (Klb/hr)	—	--				
7. Steam/~~Water~~ Press. (psig)	12.2	12.0	12.0	11.0	9.5	
8. Smoke Meter	—	--	-			
9. Register Setting	—					
0. Register Setting	—					
Fuel Control	MAN	MAN	MAN	MAN	[illegible]	
2. Air Control	AUTO	AUTO	[illegible]	[illegible]		
3. [illegible]	[illegible]	150	145	141	[illegible]	
N2 in fuel (%)						

otes:

Test No. 1 to 5
Test Engr. H[illegible]

K V B, INC.

MOBILE LABORATORY DATA

Test Number 50
Unit Number 1
Fuel GAS
Capacity (k#/hr) 8.0
Furnace Type KEWANEE F.T.
Date 12-17-75
Owner NORTON F[illegible]
Location S. [illegible]
Identification Ha[illegible]
Burner Type

1. Test Number	50-1		2		3		4		5	
2. Load ~~(k#/hr)~~ %	100 %		80 %		60 %		40 %		20 %	
3. Flue Diameter (ft)	1.42		→							
4. Probe Position	≈10″		→							
5.										
6.										
7. Water Content (% vol.)	15		15		1[illegible]		1[illegible]		1[illegible]	
8. Oxygen (%)	10.2		11.0		11.9		12.[illegible]		1[illegible].0	
9. NOx(hot line) reading/@3% O_2(ppm)	42	69.3	34	61	29	57.4	23	50	16	48
10. NO(hot line) reading/@3% O_2(ppm)	41	68	33	59.4	28	55.4	14	30.4	6	18
11. NO_2(hot line) reading/@3% O_2(ppm)	1	1.65	1	1.8	1	1.98	9	19.5	10	30
12. NOx dry @ 3% O_2(hot line)ppm	79.7		70.2		66.0		35.0		5[illegible]	
13. NO dry @ 3% O_2 (hot line)(ppm)	78.2		68.3		63.7		22.4		2[illegible]	
14. NO_2 dry @ 3% O_2 (hot line)(ppm)	1.5		1.9		2.3		12.6		34.5	
15. Carbon Dioxide (%)	5.4		4.8		4.4		3.7		2.3	
16. Carbon Monoxide (ppm) uncor./cor.	0	0	0	0	0	0	0	0	0	0
17. Hydrocarbon (ppm)	16		16		17		24-54		110-170	
18. Sulfur Trioxide (ppm)										
19. Sulfur Dioxide (ppm)										
20. Total Particulate (g/Mcal)										
21. Total Particulate (lb/Mbtu)										
22. Smoke Spot (Bacharach)										
23. NO(cold line)reading/dry @3% (ppm)	1[illegible]		31	56	24	42.5	4	[illegible]	1	3
24. NO (cold) ! @3% ppm ″	1[illegible]		52.8		49.9		9.1[illegible]		3.1[illegible]	
25. Atmos. Temp. (F°/C°)										
26. Dew Point Temp. (F°/C°)										
27. Atmos. Pressure(in.Hg)										

NOTE : Problem with heated line. Doesn't [illegible] hot enough.

Sheet ________ of ________

K V B, INC.

CONTROL ROOM DATA

Number: [illegible]
Date: [illegible]-17-7[illegible]
Unit Number: [illegible] 1
Owner: [illegible]
Fuel:
Location: [illegible]
Capacity (K#/hr): 5[illegible]
Identification:
Furnace Type: [illegible]
Burner Type:

1. Test Number	[illegible]	[illegible]	52-9			
2. Load (k#/hr)	8[illegible]	80[illegible]	[illegible]			
3.						
4.						
5. Oxygen (%)						
6.						
7. Feedwater Flow (Klb/hr)	—	—				
8. Superheat Temp (°F/°C)						
9. AH Gas Temp. (°F/°C) (In/Out)						
0. FD Fan	—	—	—			
1. ID Fan	—	—	—			
1 Flow (lb/hr) (gal/hr)						
3. Air Flow	—		—			
4. Fuel Pressure (psig) [illegible]	1.0	.[illegible]	.37			
5. Atomizing Steam Press. (psig)	—	—				
5. Steam/Water Flow (Klb/hr)	—	—				
7. Steam/~~Water~~ Press. (psig)	115	130	120			
3. Smoke Meter	—	—	—			
9. Register Setting	—	—				
0. Register Setting	—					
[illegible]	MAN	MAN	MAN			
[illegible]	MAN	MAN	MAN			
[illegible] — [illegible] °F	110	108	108			
N2 in fuel (%)						

otes:

60-2

Test No. 6 to 8

K V B, INC.

Test Engr. ____________

MOBILE LABORATORY DATA

est Number 58

nit Number 1

uel GAS

apacity (k#/hr) 8.0

urnace Type KEWANEE W-T

Date 12-17-78

Owner N A F B

Location S Bernardino

Identification Hans

Burner Type Ring

1. Test Number	58,6		7		8			
2. Load ~~(k#/hr)~~ %	80%		80%		80%			
3. Flue Diameter (ft)	1.42		1.42		1.42			
4. Probe Position	≈10"		≈10"		≈10"			
5.								
6.								
7. Water Content (% vol.)	15		15		15			
8. Oxygen (%)	8.5		5.5		3.2			
9. NOx(hot line) reading/@3% O_2(ppm)	45	64.8	44	51	39	39.4		
0. NO(hot line) reading/@3% O_2(ppm)	44	63.4	43	50	32	32.3		
1. NO_2(hot line) reading/@3% O_2(ppm)	1	1.44	1	1.16	7	7.1		
.Ox dry @ 3% O_2(hot line)ppm	74.5		58.7		45.3			
. NO dry @ 3% O_2 (hot line)(ppm)	72.9		57.5		37.2			
. NO_2 dry @ 3% O_2 (hot line)(ppm)	1.6		1.2		8.1			
. Carbon Dioxide (%)	6.4		8.2		9.4			
. Carbon Monoxide (ppm) uncor./cor.	0	0	0	250	>2	2000		
. Hydrocarbon (ppm)	15		17		240			
. Sulfur Trioxide (ppm)								
. Sulfur Dioxide (ppm)								
. Total Particulate (g/Mcal)								
. Total Particulate (lb/Mbtu)								
. Smoke Spot (Bacharach)	111		11		11			
. NO(cold line)reading/dry @3%(ppm)	50	72	44	51	35	35.4		
. NO_x (cold) dry @ 3% ppm	75.6		53.6		37.2			
. Atmos. Temp. (F°/C°)								
. Dew Point Temp. (F°/C°)								
. Atmos. Pressure(in.Hg)								

K V B. INC.

Test No. 58-9
Engr. CT

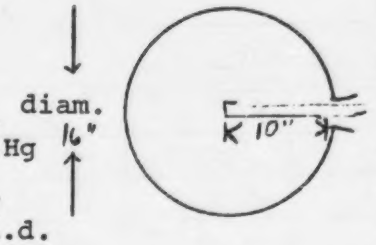
STACK DATA

Date 12/17/73 Location NORTON Unit No. 3 Fuel GAS

Load 35% K#/hr or MBtu/hr Filter No. 25

Sample Box No. — Meter Box No. — Probe No. — Probe Length 10' in st

Filter Heater Setting ____
Probe Heater Setting ____
Stack Moisture ____ %
Ambient Temperature 50 °F
Nozzle Diameter 1/2 in.
Atmospheric Pressure 29.9 in.Hg
Weather CLEAR
Stack Gas Pressure, Ps ____ iwg
Stack Gas Sp. Gravity, Gs ____ n.d.



Remarks

Time	Vm Meter Volume Reading (CF)	Vacuum Gage Reading (iwg)	ΔP Pitot Tube Pressure * (iwg)	H Orfice Pressure Diff (°F)	Stack Temp. (°F)	Impinger Temperature Out (°F)	Impinger Temperature In (°F)	Filter Box Temp. (°F)	Meter Temp. (°F)
19:40	2450.3	9	.08 *	1.59	215	50	120	190	55
[illegible]	2463.7	9	.18 *	1.58	220	60	210	260	50
[illegible]	2474.9	8.5	.26 *	1.57	210	60	200	240	60
[illegible]	2484.2	8.5	0.33 *	1.58	220	60	205	245	60
	2493.3	8.5	0.30 *	1.58	220	60	220	250	70
2030	2503.4	9	0 30 *	1.58	220	60	210	240	70
2040	2514.9	9	0.30 *	1.60	220	55	240	265	75
2050	2525.2	9	0.10 *	1.60	220	50	205	230	75
2100	2535.4	9	0.04	1.60	220	50	230	245	80
2110	2545.8	9	0.04	1.60	220	50	215	245	80
2115	2550.3	9	0.04	1.60	220	50	210	250	80
Total	100	97.5	0.12	17.48	2405 °F	605	2265	2680	835
Avg.		8.86	0.04 **	1.59	218.64 °F + 460	55	205.9	243.6	75.9

Ts= 677.64 °R

* First TUBE; NOT SETTING PROPERLY
Fitting
The first 8 ΔP readings are
incorrect

** LAST 3 READINGS USED BECAUSE
OF ABOVE MENTIONED REASON

TA,

K V B, INC.

Particulate Weight Calculations

Test No. [illegible]-9
Engr.

FILTER BEFORE TEST

Filter	Sample No. 25	Tare No. 26	Tare No. 27	Comments
1st wt. (gr)	.7309	.7064	.7283	
2nd wt. (gr)	.7312	.7064	[illegible]	
3rd wt. (gr)	.7311	.7063	[illegible]	
4th wt. (gr)				
Initial (gr)	.7311	.7064	.7281	

FILTER AFTER TEST

1st wt. (gr)	.7345	[illegible]	.7287
2nd wt. (gr)	.7347	[illegible]	.7285
3rd wt. (gr)			
4th wt. (gr))			
Final (gr)	[illegible]	0.7056	.7286

CONTAINER BEFORE TEST

	Front End No. 1	Back End No. 2	Desicant No. —	Tare No. 13	Tare No. 2
1st wt. (gr)	27.5264	26.7017	229.67	27.5[illegible]	[illegible]
2nd wt. (gr)	27.5265	26.7019		27.5612	[illegible]
3rd wt. (gr)					
4th wt. (gr)					
Final (gr)	[illegible]	[illegible]	229.67	27.5612	

CONTAINER AFTER TEST

1st wt. (gr)	27.5278	26.7067	229.67	[illegible]	[illegible]
2nd wt. (gr)	27.5278	26.7067		[illegible]	27.5[illegible]
3rd wt. (gr)				27.5612	
4th wt. (gr)					
Final (gr)	27.5278	[illegible]	229.67	27.5612	[illegible]

Test No. 58-9 Date 12/18/73 Location NORTON Engr.
Unit No. 1 Fuel GAS Load 35% K#/hr. MBtu/hr

Test No. 58-9

K V B. INC.

COLLECTED LIQUID

	Imp. 1	Imp. 2	Imp. 3	Desiccant		Total Liquid
Final vol. (ml)	151	102	0	247.77	(gr/ml)	
Initial vol. (ml)	100	100	[illegible]	229.67	(gr)	
Increase (ml)	51	2	0	18.10	(ml)	71.10 (ml)

FILTER SUMMARY

	Sample Filter No. 25	Tare Filter No. 26	Tare Filter No. 27	Front Contr. No. 1	Back Contr. No. 2	Tare Contr. No. 1B	Tare Contr. No. 2B
Final wt. (gr)	0.7346	0.7056	0.7286	27.52[illegible]	26.7067	[illegible]	[illegible]
Initial wt. (gr)	0.7311	0.7064	0.7291	27.5265	26.7018	27.8612	27.5359
Increase (gr)	0.0035	-0.0008	-0.0005	0.0012	0.0049	[illegible]	-[illegible]

	Filter No. 25	Front No. 1	Back No. 2
Increase (gr)	0.0035	0.0012	0.0049
± Tare (gr)	0.0007	[illegible]	-[illegible]
Part wt.	0.0042	0.0012	[illegible]

PARTICULATE SUMMARY

Filter Particulates	0.0042	gr
Front End Particulates	[illegible]	gr
Back End Particulates	[illegible]	gr
Total	0.0101	gr Mn= 10.1 milligrams

K V B. INC.

Test No. 58-9

EMISSION CALCULATIONS

Test No. 58-9 Date 12/18/73 Location NORTON Engr. [illegible]

Unit No. 1 Fuel GAS Load 2.8 K#/hr ____ MBtu/hr

Pitot Factor, F_s 0.83 Barometric Pressure, P_{bar} 29.9 in.Hg.

Total Liquid Collected, V_{lc} 71.1 ml Total Particulate, M_n 10.1 m gm

Velocity Head, ΔP .04 iwg Stack Temperature, T_s 679 °Rankine

Sample Volume V_m 100 ft³ Stack Gas Pressure, P_s 4.5 iwg

Orfice Press. Diff, H 1.59 iwg Stack Gas Sp. Gravity, G_s 1 n.d.

1.	Sampled Gas Volume	$Vm_{std}=0.0334\ Vm\ (P_{bar}+\frac{H}{13.6})$	100.26	SCF
2.	Water Vapor	$Vw_{std} = 0.0474\ Vlc$	3.37	SCF
3.	Moisture Content	Bwo = Eq. 2/ (Eq. 1 + Eq. 2)	0.033	N.D.
4.	Concentration (grains)	$Cs = 0.0154\ \frac{Mn}{Vm_{std}}$	1.55×10^{-3}	gn./SCF
5.	Concentration	$cs = 2.205 \times 10^{-6}\ \frac{Mn}{Vm_{std}}$	$.22215 \times 10^{-6}$	lb/SCF
6.	Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P T_s}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1.33	[illegible]	FPM
7.	Stack Area	$As = 0.786\ (diam)^2$	1.39	ft²
8.	Stack Gas Flow Rate @ 32°F	$Qs : Eq.6 \times Eq.7 \times \frac{492}{Ts} \times \frac{Ps}{407}$	[illegible]	SCFM
9.	Material Flow ~~Area~~ K#	a. Ms = Eq.4 x Eq.8 x 60	[illegible] X	grain/hr
		b. Ms = Eq.5 x Eq. 8 x 60	[illegible]	lb/hr
10.	Emission	a. E = .0648 Eq. 9a/Load	[illegible] 7.15	gm/MBtu
		b. e = Eq. 9b/Load	3600.31 [illegible]	lb/MBtu
		c. E = Eq. 10b x 1.8	6490.57 x 10 [illegible]	gm/MCal

Test N° 58-9
Boiler N° 3
load 35%
Furnace: Kewanee F.T.
location: Norton AFB

12-18-73

Vel. Traverse

Sample Point	Pitot Tube Pressure	Stack Temp	Velocity
0" in	0.08		22.62
4" in	0.08		21.63
8" in	0.08		21.63
12"	0.09		22.62
16	0.1	235	24.19
12	0.08		21.63
8	0.07		20.21
4	0.08		21.63
0	0.09		22.62
			198.78

$V_s = 2.9\sqrt{H \times T_s}$ [ft/sec]
T_s = stack Temp. + 460
$T_s = 695$

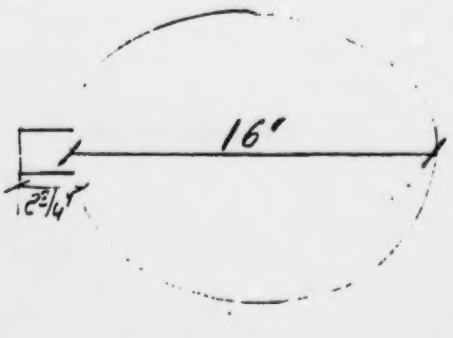
Av. 22.09 ft/sec

22.09 × 0.83 = 18.33

Sampling point 10" in stack

Use 1/2" nozzle

Note: During part. test we discovered that our pitot tube fitting was damaged. Vel. traverse readings might be wrong.



APPENDIX F

TABULATION OF 15-MINUTE DATA

24 HOUR DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	CO PPMV MEAS	NO PPMV MEAS	CO PPMV 3%O2	NO PPMV 3%O2	CO NG/J	NO NG/J
8/ 5/80		.0	8.3	7.4	20	58	28	82	9	44
8/ 6/80		.0	8.4	7.3	31	57	44	81	14	44
8/ 7/80		.0	6.3	8.4	37	51	45	62	15	33
8/ 8/80		.0	6.2	8.6	81	59	98	71	32	38
8/12/80		.0	8.6	6.5	21	39	30	56	10	30
8/13/80		.0	7.2	7.5	27	40	35	52	11	28
8/14/80		.0	6.4	8.1	28	43	34	52	11	28
8/15/80		.0	6.8	7.8	24	42	30	53	10	28
8/18/80		.0	7.4	7.4	32	39	42	51	13	27
8/19/80		.0	8.1	6.6	30	38	42	53	13	28
8/20/80		.0	7.5	7.3	27	40	36	53	11	29
8/21/80		.0	7.7	7.3	18	41	24	55	8	30
8/22/80		.0	6.9	7.6	26	43	33	55	11	29
8/25/80		.0	7.4	7.2	27	39	35	51	11	28
8/26/80		.0	6.5	8.0	23	43	28	53	9	29
8/27/80		.0	7.6	6.9	35	40	47	53	15	29
8/28/80		.0	5.6	8.8	73	49	85	57	28	31
8/29/80		.0	5.6	8.7	22	50	25	58	8	31
9/ 2/80		.0	9.5	5.7	57	37	89	58	29	31
9/ 3/80		.0	7.6	7.0	107	37	143	49	47	26
9/ 4/80		.0	5.8	8.6	89	46	105	54	34	29
9/ 5/80		.0	5.9	8.6	49	47	58	56	19	30
9/ 8/80		.0	6.2	8.5	99	48	120	58	39	31
9/ 9/80		.0	8.4	6.7	370	42	531	60	175	32
9/10/80		.0	9.7	6.0	197	39	313	62	103	33
9/11/80		.0	8.4	6.9	544	43	781	61	258	33

```
*****************************************************************************************
**                                 15 MIN. DATA                                        **
**                        DRY STACK GAS CONCENTRATION                                  **
**                                                                                     **
**                          O2      CO2     CO     NO     CO     NO     CO     NO  ACODE **
**                 LOAD    VOL%    VOL%    PPMV   PPMV   PPMV   PPMV   NG/J   NG/J     **
**  DATE    TIME   MWTH    MEAS    MEAS    MEAS   MEAS   3%O2   3%O2                   **
*****************************************************************************************
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 0/ 0/ 0     0     .0      .0      .0      0      0      0      0      0      0   *  **
** 8/ 5/80   830     .0     6.2     8.6     37     48     45     58     14     31   A  **
** 8/ 5/80   845     .0     6.1     8.6     39     48     47     58     15     31      **
** 8/ 5/80   900     .0     7.2     8.2     28     52     36     67     12     36      **
** 8/ 5/80   915     .0     7.2     8.2     28     52     36     67     12     36      **
** 8/ 5/80   930     .0     8.0     7.5     21     52     29     72      9     39      **
** 8/ 5/80   945     .0     8.0     7.5     21     51     29     70      9     38      **
** 8/ 5/80  1000     .0     8.0     7.5     22     52     30     72     10     39      **
** 8/ 5/80  1015     .0     8.4     7.4     18     54     25     77      8     41      **
** 8/ 5/80  1030     .0     8.0     7.5     18     53     24     73      8     39      **
** 8/ 5/80  1045     .0     8.5     7.4     17     54     24     77      8     42      **
** 8/ 5/80  1100     .0     8.7     7.2     18     55     26     80      8     43      **
** 8/ 5/80  1115     .0     8.7     7.2     18     53     26     77      8     42      **
** 8/ 5/80  1130     .0     8.6     7.3     18     55     26     80      8     43      **
** 8/ 5/80  1145     .0     8.7     7.2     17     54     24     79      8     42      **
** 8/ 5/80  1200     .0     8.8     7.1     18     56     26     82      8     44      **
*****************************************************************************************
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***********************************************************************************************
**                                                                                           **
**                                      15 MIN. DATA                                         **
**                             DRY STACK GAS CONCENTRATION                                   **
**                                                                                           **
**                             O2     CO2     CO     NO     CO     NO                        **
**                    LOAD    VOL%   VOL%    PPMV   PPMV   PPMV   PPMV    CO     NO          **
**   DATE     TIME    MWTH    MEAS   MEAS    MEAS   MEAS   3%O2   3%O2   NG/J   NG/J  ACODE  **
***********************************************************************************************
** 8/ 5/80    1215     .0     8.8    7.1     18     58     26     85      8     46           **
** 8/ 5/80    1230     .0     8.7    7.2     17     59     24     86      8     46           **
** 8/ 5/80    1245     .0     8.6    7.2     17     59     24     85      8     46           **
** 8/ 5/80    1300     .0     8.7    7.2     18     58     26     85      8     46           **
** 8/ 5/80    1315     .0     8.7    7.2     18     60     26     88      8     47           **
** 8/ 5/80    1330     .0     8.8    7.1     17     60     25     88      8     48           **
** 8/ 5/80    1345     .0     8.8    7.1     17     60     25     88      8     48           **
** 8/ 5/80    1400     .0     8.9    7.0     16     62     23     92      7     50           **
** 8/ 5/80    1415     .0     8.8    7.1     17     61     25     90      8     48           **
** 8/ 5/80    1430     .0     8.7    7.2     18     62     26     90      8     49           **
** 8/ 5/80    1445     .0     8.7    7.2     18     63     26     92      8     50           **
** 8/ 5/80    1500     .0     8.6    7.2     18     63     26     91      8     49           **
** 8/ 5/80    1515     .0     8.5    7.4     20     62     28     89      9     48           **
** 8/ 5/80    1530     .0     8.5    7.4     20     62     28     89      9     48           **
** 8/ 5/80    1545     .0     8.5    7.4     20     62     28     89      9     48           **
** 8/ 5/80    1600     .0     8.4    7.4     20     61     28     87      9     47           **
** 8/ 5/80    1615     .0     8.5    7.4     20     62     28     89      9     48           **
** 8/ 5/80    1630     .0     8.5    7.4     20     63     28     90      9     49           **
** 8/ 5/80    1645     .0     8.6    7.2     17     64     24     93      8     50           **
** 8/ 5/80    1700     .0     8.4    7.3     19     60     27     85      8     46           **
** 8/ 5/80    1715     .0     8.3    7.4     19     61     26     86      8     47           **
** 8/ 5/80    1730     .0     8.4    7.3     19     60     27     85      8     46           **
** 8/ 5/80    1745     .0     8.3    7.4     20     59     28     83      9     45           **
** 8/ 5/80    1800     .0     8.3    7.4     21     60     29     85      9     46           **
** 8/ 5/80    1815     .0     8.7    7.2     20     62     29     90      9     49           **
** 8/ 5/80    1830     .0     8.6    7.3     20     61     29     88      9     48           **
** 8/ 5/80    1845     .0     8.6    7.3     21     60     30     87     10     47           **
** 8/ 5/80    1900     .0     8.7    7.2     20     61     29     89      9     48           **
** 8/ 5/80    1915     .0     8.5    7.4     20     62     28     89      9     48           **
** 8/ 5/80    1930     .0     8.6    7.3     20     63     29     91      9     49           **
** 8/ 5/80    1945     .0     8.5    7.4     20     63     28     90      9     49           **
** 8/ 5/80    2000     .0     8.5    7.4     20     63     28     90      9     49           **
** 8/ 5/80    2015     .0     8.5    7.4     20     62     28     89      9     48           **
** 8/ 5/80    2030     .0     8.4    7.3     20     63     28     90      9     48           **
** 8/ 5/80    2045     .0     8.4    7.3     20     63     28     90      9     48           **
** 8/ 5/80    2100     .0     8.4    7.3     20     63     28     90      9     48           **
** 8/ 5/80    2115     .0     8.4    7.3     21     62     30     88      9     48           **
** 8/ 5/80    2130     .0     8.3    7.4     21     61     29     86      9     47           **
** 8/ 5/80    2145     .0     8.3    7.4     21     63     29     89      9     48           **
** 8/ 5/80    2200     .0     8.3    7.4     22     59     31     83     10     45           **
** 8/ 5/80    2215     .0     8.2    7.4     21     58     29     81      9     44           **
** 8/ 5/80    2230     .0     8.2    7.4     22     57     31     80     10     43           **
** 8/ 5/80    2245     .0     8.2    7.4     22     56     31     78     10     42           **
** 8/ 5/80    2300     .0     8.3    7.4     22     56     31     79     10     43           **
** 0/ 0/ 0       0     .0      .0     .0      0      0      0      0      0      0     *     **
** 0/ 0/ 0       0     .0      .0     .0      0      0      0      0      0      0     *     **
** 0/ 0/ 0       0     .0      .0     .0      0      0      0      0      0      0     *     **
** 0/ 0/ 0       0     .0      .0     .0      0      0      0      0      0      0     *     **
***********************************************************************************************
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**************************************************************************************************
**                                                                                              **
**                                        15 MIN. DATA                                          **
**                                DRY STACK GAS CONCENTRATION                                   **
**                                                                                              **
**                                 O2     CO2     CO      NO      CO      NO                    **
**                         LOAD   VOL%   VOL%    PPMV    PPMV    PPMV    PPMV    CO      NO  ACODE **
**    DATE         TIME    MWTH   MEAS   MEAS    MEAS    MEAS    3%O2    3%O2   NG/J    NG/J     **
**************************************************************************************************
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 8/ 6/80          515     .0    8.8    7.1      20      58      29      85      9      46       **
** 8/ 6/80          530     .0    8.9    7.0      19      59      28      88      9      47       **
** 8/ 6/80          545     .0    9.0    7.0      20      59      30      88      9      48       **
** 8/ 6/80          600     .0    9.1    6.9      20      59      30      89     10      48       **
** 8/ 6/80          615     .0    7.5    8.1      18      65      24      86      7      47       **
** 8/ 6/80          630     .0    7.6    7.8      20      66      26      88      8      48       **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 0/ 0/ 0            0     .0     .0     .0       0       0       0       0      0       0   *   **
** 8/ 6/80          800     .0    8.5    7.4      20      55      28      79      9      43       **
** 8/ 6/80          815     .0    8.4    7.4      21      56      30      80      9      43       **
** 8/ 6/80          830     .0    8.5    7.4      21      56      30      80     10      43       **
** 8/ 6/80          845     .0    8.6    7.2      23      55      33      80     11      43       **
** 8/ 6/80          900     .0    8.7    7.2      30      55      44      80     14      43       **
** 8/ 6/80          915     .0    8.7    7.2      29      55      42      80     14      43       **
** 8/ 6/80          930     .0    8.8    7.1      30      54      44      79     14      43       **
** 8/ 6/80          945     .0    8.8    7.1      30      54      44      79     14      43       **
** 8/ 6/80         1000     .0    8.9    7.0      30      53      44      79     14      42       **
** 8/ 6/80         1015     .0    8.8    7.1      28      53      41      78     13      42       **
** 8/ 6/80         1030     .0    8.8    7.1      28      53      41      78     13      42       **
** 8/ 6/80         1045     .0    8.3    7.4      23      55      32      78     10      42       **
** 8/ 6/80         1100     .0    8.1    7.1      25      56      34      78     11      42       **
** 8/ 6/80         1115     .0    8.3    7.4      24      56      34      79     11      43       **
** 8/ 6/80         1130     .0    8.4    7.3      24      56      34      80     11      43       **
** 8/ 6/80         1145     .0    8.3    7.4      23      57      32      80     10      43       **
** 8/ 6/80         1200     .0    8.4    7.3      23      57      32      81     10      44       **
**************************************************************************************************
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*******************************************************************************************
**                                                                                       **
**                                    15 MIN. DATA                                       **
**                          DRY STACK GAS CONCENTRATION                                  **
**                                                                                       **
**                               O2     CO2     CO     NO     CO     NO     CO     NO  ACODE **
**                       LOAD   VOL%    VOL%   PPMV   PPMV   PPMV   PPMV   NG/J   NG/J      **
**   DATE        TIME    MWTH   MEAS    MEAS   MEAS   MEAS   3%O2   3%O2                    **
*******************************************************************************************
** 8/ 6/80       1215     .0     8.4     7.3     22     58     31     83     10     45        **
** 8/ 6/80       1230     .0     8.1     7.1     20     60     27     83      9     45        **
** 8/ 6/80       1245     .0     8.2     7.4     22     60     31     84     10     45        **
** 8/ 6/80       1300     .0     8.1     7.1     22     56     30     78     10     42        **
** 8/ 6/80       1315     .0     8.0     7.5     23     61     31     84     10     45        **
** 8/ 6/80       1330     .0     7.8     7.7     41     63     56     86     18     46        **
** 8/ 6/80       1345     .0     7.9     7.6     35     63     48     86     15     47        **
** 8/ 6/80       1400     .0     7.7     7.7     37     62     50     84     16     45        **
** 8/ 6/80       1415     .0     7.6     7.8     39     63     52     84     17     45        **
** 8/ 6/80       1430     .0     7.7     7.7     37     62     50     84     16     45        **
** 8/ 6/80       1445     .0     7.8     7.7     38     60     51     81     17     44        **
** 8/ 6/80       1500     .0     7.9     7.6     39     55     53     75     17     41        **
** 8/ 6/80       1515     .0     7.8     7.7     28     57     38     77     12     42        **
** 8/ 6/80       1530     .0     7.7     7.7     29     57     39     77     12     41        **
** 8/ 6/80       1545     .0     7.6     7.8     30     58     40     78     13     42        **
** 8/ 6/80       1600     .0     7.5     7.9     29     54     38     72     12     39        **
** 8/ 6/80       1615     .0     7.5     7.9     29     56     38     74     12     40        **
** 8/ 6/80       1630     .0     7.6     7.8     31     56     41     75     13     40        **
** 8/ 6/80       1645     .0     7.8     7.7     41     57     56     77     18     42        **
** 8/ 6/80       1700     .0     7.8     7.7     39     58     53     79     17     42        **
** 8/ 6/80       1715     .0     7.9     7.6     40     58     55     79     18     43        **
** 8/ 6/80       1730     .0     7.9     7.6     42     57     57     78     19     42        **
** 8/ 6/80       1745     .0     8.0     7.5     40     58     55     80     18     43        **
** 8/ 6/80       1800     .0     8.0     7.5     39     59     54     81     17     44        **
** 8/ 6/80       1815     .0     8.7     7.4     29     55     42     80     14     43        **
** 8/ 6/80       1830     .0     8.7     7.4     29     56     42     82     14     44        **
** 8/ 6/80       1845     .0     8.9     7.0     35     55     52     82     17     44        **
** 8/ 6/80       1900     .0     9.0     7.0     37     55     55     82     18     44        **
** 8/ 6/80       1915     .0     9.1     6.9     38     55     57     83     19     45        **
** 8/ 6/80       1930     .0     9.1     6.9     38     56     57     84     19     46        **
** 8/ 6/80       1945     .0     9.2     6.9     38     55     58     84     19     45        **
** 8/ 6/80       2000     .0     9.1     6.9     38     55     57     83     19     45        **
** 8/ 6/80       2015     .0     9.0     7.0     37     56     55     84     18     45        **
** 8/ 6/80       2030     .0     9.2     6.9     36     55     55     84     18     45        **
** 8/ 6/80       2045     .0     9.3     6.8     39     55     60     84     19     46        **
** 8/ 6/80       2100     .0     9.3     6.8     41     56     63     86     20     46        **
** 8/ 6/80       2115     .0     9.1     6.9     40     56     60     84     20     46        **
** 8/ 6/80       2130     .0     9.0     7.0     37     57     55     85     18     46        **
** 8/ 6/80       2145     .0     8.9     7.0     32     57     47     85     15     46        **
** 8/ 6/80       2200     .0     8.5     7.4     30     58     43     83     14     45        **
** 8/ 6/80       2215     .0     8.3     7.4     31     58     44     82     14     44        **
** 8/ 6/80       2230     .0     8.3     7.4     35     59     49     83     16     45        **
** 8/ 6/80       2245     .0     8.2     7.4     32     60     45     84     14     45        **
** 8/ 6/80       2300     .0     8.3     7.4     30     61     42     86     14     47        **
** 0/ 0/ 0          0     .0      .0      .0      0      0      0      0      0      0   •    **
** 0/ 0/ 0          0     .0      .0      .0      0      0      0      0      0      0   •    **
** 0/ 0/ 0          0     .0      .0      .0      0      0      0      0      0      0   •    **
** 0/ 0/ 0          0     .0      .0      .0      0      0      0      0      0      0   •    **
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*******************************************************************************************
**                                     15 MIN, DATA
**                              DRY STACK GAS CONCENTRATION                              **
**                                                                                       **
**                            O2    CO2     CO     NO     CO     NO     CO     NO  ACUDE **
**                   LOAD   VOL%   VOL%   PPMV   PPMV   PPMV   PPMV   NG/J   NG/J        **
**   DATE      TIME  MWTH   MEAS   MEAS   MEAS   MEAS   3%O2   3%O2                      **
*******************************************************************************************
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 0/ 0/ 0        0    .0     .0     .0      0      0      0      0      0      0    *   **
** 8/ 7/80     1115    .0    6.5    8.1     18     51     22     63      7     34        **
** 8/ 7/80     1130    .0    6.5    8.1     36     53     44     65     14     35        **
** 8/ 7/80     1145    .0    6.6    8.0     33     55     41     68     13     37        **
** 8/ 7/80     1200    .0    6.8    7.9     29     49     36     62     12     33        **
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****************************************************************************************************
**                                                                                               **
**                                         15 MIN. DATA                                          **
**                                DRY STACK GAS CONCENTRATION                                    **
**                                                                                               **
**                                 O2     CO2     CO      NO      CO      NO                     **
**                         LOAD   VOL%   VOL%    PPMV    PPMV    PPMV    PPMV    CO      NO  ACODE **
**   DATE        TIME      MWTH   MEAS   MEAS    MEAS    MEAS    3%O2    3%O2   NG/J    NG/J      **
****************************************************************************************************
** 8/ 7/80      1215       .0     6.3    8.2      38      58      46      71     15      38       **
** 8/ 7/80      1230       .0     6.8    8.0      24      60      30      76     10      41       **
** 8/ 7/80      1245       .0     6.5    7.3      18      61      22      75      7      41       **
** 8/ 7/80      1300       .0     5.8    8.6      66      50      78      59     25      32       **
** 8/ 7/80      1315       .0     5.4    8.8      68      53      78      61     25      33       **
** 8/ 7/80      1330       .0     6.4    8.3      25      53      30      65     10      35       **
** 8/ 7/80      1345       .0     6.1    8.4      50      55      60      66     19      36       **
** 8/ 7/80      1400       .0     5.9    8.6      34      59      40      70     13      38       **
** 8/ 7/80      1415       .0     6.4    8.2      20      58      24      71      8      38       **
** 8/ 7/80      1430       .0     6.4    8.3      45      52      55      64     18      34       **
** 8/ 7/80      1445       .0     6.3    8.3      22      51      26      62      8      33       **
** 8/ 7/80      1500       .0     6.4    8.4      63      52      77      64     25      34       **
** 8/ 7/80      1515       .0     6.5    8.3      55      52      68      64     22      35       **
** 8/ 7/80      1530       .0     6.3    8.3      52      53      63      64     21      35       **
** 8/ 7/80      1545       .0     5.8    8.8      50      57      59      67     19      36       **
** 8/ 7/80      1600       .0     6.1    8.6      31      58      37      70     12      38       **
** 8/ 7/80      1615       .0     6.8    8.1      24      48      30      60     10      33       **
** 8/ 7/80      1630       .0     6.9    8.0      24      48      30      61     10      33       **
** 8/ 7/80      1645       .0     7.3    7.8      36      46      47      60     15      32       **
** 8/ 7/80      1700       .0     8.4    7.5      73      45     104      64     34      34       **
** 8/ 7/80      1715       .0     7.0    7.8      25      48      32      61     10      33       **
** 8/ 7/80      1730       .0     7.2    7.9      22      43      28      56      9      30       **
** 8/ 7/80      1745       .0     7.4    7.9      28      42      37      55     12      30       **
** 8/ 7/80      1800       .0     6.9    8.2      40      48      51      61     16      33       **
** 8/ 7/80      1815       .0     7.0    8.1      26      58      33      74     11      40       **
** 8/ 7/80      1830       .0     6.2    8.7      30      53      36      64     12      35       **
** 8/ 7/80      1845       .0     6.3    8.6      25      51      30      62     10      33       **
** 8/ 7/80      1900       .0     6.6    8.5      66      50      82      62     27      33       **
** 8/ 7/80      1915       .0     6.5    8.4      53      51      65      63     21      34       **
** 8/ 7/80      1930       .0     5.7    8.9      75      50      88      58     29      31       **
** 8/ 7/80      1945       .0     5.9    8.9      32      49      38      58     12      31       **
** 8/ 7/80      2000       .0     6.2    8.8      32      53      38      64     12      35       **
** 8/ 7/80      2015       .0     5.6    9.0      35      50      40      58     13      31       **
** 8/ 7/80      2030       .0     6.0    8.8      38      51      45      61     15      33       **
** 8/ 7/80      2045       .0     6.4    8.6      11      51      13      62      4      34       **
** 8/ 7/80      2100       .0     6.7    8.5      25      50      31      63     10      34       **
** 8/ 7/80      2115       .0     6.6    8.5      25      51      31      63     10      34       **
** 8/ 7/80      2130       .0     6.3    8.7      25      52      30      63     10      34       **
** 8/ 7/80      2145       .0     5.4    9.2      48      53      55      61     18      33       **
** 8/ 7/80      2200       .0     5.1    9.4      40      50      45      56     14      30       **
** 8/ 7/80      2215       .0     5.0    9.4      40      55      45      61     14      33       **
** 8/ 7/80      2230       .0     5.2    9.4      42      51      47      58     15      31       **
** 8/ 7/80      2245       .0     5.5    9.1      41      53      47      61     15      33       **
** 8/ 7/80      2300       .0     5.5    9.1      28      53      32      61     10      33       **
** 0/ 0/ 0         0       .0      .0     .0       0       0       0       0      0       0   •   **
** 0/ 0/ 0         0       .0      .0     .0       0       0       0       0      0       0   •   **
** 0/ 0/ 0         0       .0      .0     .0       0       0       0       0      0       0   •   **
** 0/ 0/ 0         0       .0      .0     .0       0       0       0       0      0       0   •   **
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**                                            15 MIN. DATA                                **
**                                    DRY STACK GAS CONCENTRATION                         **
**                                                                                        **
**                             O2      CO2     CO      NO      CO      NO      CO     NO   ACODE  **
**                     LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J   NG/J        **
**  DATE       TIME    MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                       **
********************************************************************************************
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0    ●    **
** 8/ 8/80     515      .0     7.8     7.7      16      53      21      72       7     39         **
** 8/ 8/80     530      .0     6.1     8.7      17      57      20      68       6     37         **
** 8/ 8/80     545      .0     4.1     9.8     296      63     315      67     104     36         **
** 8/ 8/80     600      .0     3.3    10.0     493      67     501      68     165     36         **
** 8/ 8/80     615      .0     4.2     9.7     341      62     365      66     120     36         **
** 8/ 8/80     630      .0     4.5     9.5     286      62     312      67     103     36         **
** 8/ 8/80     645      .0     4.0     9.8     369      64     390      67     129     36         **
** 8/ 8/80     700      .0     4.5     9.5     270      62     294      67      97     36         **
** 8/ 8/80     715      .0     4.4     9.6     290      62     314      67     103     36         **
** 8/ 8/80     730      .0     4.8     9.4     207      60     230      66      75     36         **
** 8/ 8/80     745      .0     4.7     9.5     211      60     233      66      76     35         **
** 8/ 8/80     800      .0     4.8     9.4     208      60     231      66      76     36         **
** 8/ 8/80     815      .0     5.5     9.0     181      56     210      65      69     35         **
** 8/ 8/80     830      .0     6.8     8.3      53      54      67      68      22     37         **
** 8/ 8/80     845      .0     6.5     8.4      74      50      91      62      30     33         **
** 8/ 8/80     900      .0     6.2     8.4       5      48       6      58       2     31         **
** 8/ 8/80     915      .0     6.4     8.4      29      50      35      61      11     33         **
** 8/ 8/80     930      .0     5.6     8.9      16      53      18      62       6     33         **
** 8/ 8/80     945      .0     6.2     8.6      10      54      12      65       4     35         **
** 8/ 8/80    1000      .0     5.8     8.8      56      56      66      66      21     36         **
** 8/ 8/80    1015      .0     6.1     8.5      24      57      29      68       9     37         **
** 8/ 8/80    1030      .0     6.2     8.5      65      58      79      70      26     38         **
** 8/ 8/80    1045      .0     5.7     8.8      20      54      23      63       7     34         **
** 8/ 8/80    1100      .0     5.9     8.7       7      52       8      62       2     33         **
** 8/ 8/80    1115      .0     5.9     8.7      93      54     110      64      36     34         **
** 8/ 8/80    1130      .0     5.7     8.8       7      56       8      65       2     35         **
** 8/ 8/80    1145      .0     6.1     8.6      10      58      12      70       3     38         **
** 8/ 8/80    1200      .0     5.9     8.5      63      58      75      69      24     37         **
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*******************************************************************************************
**                                           15 MIN. DATA                                **
**                                    DRY STACK GAS CONCENTRATION                        **
**                                                                                       **
**                            O2     CO2     CO     NO     CO     NO     CO     NO ACUDE **
**                  LOAD    VOL%    VOL%   PPMV   PPMV   PPMV   PPMV   NG/J   NG/J       **
**  DATE      TIME  MWTH    MEAS    MEAS   MEAS   MEAS   3%O2   3%O2                     **
*******************************************************************************************
** 8/ 8/80    1215    .0     6.0     8.5     53     59     63     70     21     38       **
** 8/ 8/80    1230    .0     6.1     8.6     64     60     77     72     25     39       **
** 8/ 8/80    1245    .0     5.9     8.9     74     61     88     72     29     39       **
** 8/ 8/80    1300    .0     6.0     8.9     27     63     32     75     10     41       **
** 8/ 8/80    1315    .0     6.0     8.9     50     66     60     79     19     43       **
** 8/ 8/80    1330    .0     6.2     8.7     13     67     15     81      5     44       **
** 8/ 8/80    1345    .0     6.0     8.8     10     69     12     82      3     44       **
** 8/ 8/80    1400    .0     5.8     9.0     44     73     52     86     17     46       **
** 8/ 8/80    1415    .0     5.4     9.2     16     77     18     88      6     48       **
** 8/ 8/80    1430    .0     5.6     9.0     45     68     52     79     17     43       **
** 8/ 8/80    1445    .0     5.5     9.1     15     62     17     72      5     39       **
** 8/ 8/80    1500    .0     5.5     9.1     61     64     70     74     23     40       **
** 8/ 8/80    1515    .0     5.7     8.9     15     64     17     75      5     40       **
** 8/ 8/80    1530    .0     6.0     8.7      1     65      1     78      0     42       **
** 8/ 8/80    1545    .0     6.1     8.7      3     65      3     78      1     42       **
** 8/ 8/80    1600    .0     6.5     8.5     33     67     41     83     13     45       **
** 8/ 8/80    1615    .0     6.3     8.6     47     68     57     83     19     45       **
** 8/ 8/80    1630    .0     6.8     8.3     20     68     25     86      8     46       **
** 8/ 8/80    1645    .0     6.9     8.2     20     68     25     86      8     47       **
** 8/ 8/80    1700    .0     7.0     8.1     19     68     24     87      8     47       **
** 8/ 8/80    1715    .0     6.7     8.3     19     67     23     84      7     45       **
** 8/ 8/80    1730    .0     7.0     8.0     14     67     18     86      5     46       **
** 8/ 8/80    1745    .0     8.4     7.0     32     66     45     94     15     51       **
** 8/ 8/80    1800    .0    10.0     5.4     42     55     68     90     22     48       **
** 8/ 8/80    1815    .0     6.8     8.2     25     62     31     78     10     42       **
** 8/ 8/80    1830    .0     7.2     7.9     19     59     24     77      8     41       **
** 8/ 8/80    1845    .0     8.4     6.9     32     51     45     73     15     39       **
** 8/ 8/80    1900    .0     8.7     6.7     31     47     45     68     15     37       **
** 8/ 8/80    1915    .0     8.1     7.2      0     43      0     60      0     32       **
** 8/ 8/80    1930    .0     7.0     8.0     17     43     21     55      7     30       **
** 8/ 8/80    1945    .0     8.5     6.9     13     36     18     51      6     28       **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
** 0/ 0/ 0       0    .0      .0      .0      0      0      0      0      0      0   .   **
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**                                          15 MIN. DATA                                          **
**                                 DRY STACK GAS CONCENTRATION                                    **
**                                                                                                **
**                                  O2      CO2      CO      NO      CO      NO      CO     NO  ACODE  **
**                          LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J   NG/J        **
**   DATE        TIME       MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                      **
*****************************************************************************************************
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0      0   *   **
** 8/12/80        600        .0     6.5     8.3      36      52      44      64      14     35       **
** 8/12/80        615        .0     7.3     7.4      60      52      78      68      26     37       **
** 8/12/80        630        .0     7.7     7.8      11      50      14      67       4     36       **
** 8/12/80        645        .0     7.1     7.9      12      53      15      68       5     37       **
** 8/12/80        700        .0    10.0     5.5      23      48      37      78      12     42       **
** 8/12/80        715        .0     7.3     7.9      24      50      31      65      10     35       **
** 8/12/80        730        .0     7.9     7.2      20      50      27      68       9     37       **
** 8/12/80        745        .0     6.8     8.1      34      44      43      55      14     30       **
** 8/12/80        800        .0     6.7     7.9      47      44      59      55      19     30       **
** 8/12/80        815        .0    -1.0    -1.0      -1      -1       0       0       0      0   C   **
** 8/12/80        830        .0    -1.0    -1.0      -1      -1       0       0       0      0   C   **
** 8/12/80        845        .0    -1.0    -1.0      -1      -1       0       0       0      0   C   **
** 8/12/80        900        .0    -1.0    -1.0      -1      -1       0       0       0      0   C   **
** 8/12/80        915        .0     6.3     7.3      27      46      33      56      10     30       **
** 8/12/80        930        .0     9.8     4.3      11      42      17      67       5     36       **
** 8/12/80        945        .0    11.1     4.9      11      45      20      82       6     44       **
** 8/12/80       1000        .0     8.1     7.5      30      53      41      74      13     40       **
** 8/12/80       1015        .0     7.0     7.5      31      41      39      52      13     28       **
** 8/12/80       1030        .0     9.1     5.9      14      37      21      56       7     30       **
** 8/12/80       1045        .0     6.8     8.0      26      46      33      58      10     31       **
** 8/12/80       1100        .0     8.1     6.8       8      45      11      62       3     34       **
** 8/12/80       1115        .0     6.6     8.1      28      52      35      65      11     35       **
** 8/12/80       1130        .0     7.8     7.1       7      52       9      71       3     38       **
** 8/12/80       1145        .0     6.5     8.2      27      58      33      72      11     39       **
** 8/12/80       1200        .0     9.8     4.9       6      49       9      79       3     42       **
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**                                                                                            **
**                                       15 MIN. DATA                                         **
**                             DRY STACK GAS CONCENTRATION                                    **
**                                                                                            **
**                               O2     CO2     CO     NO     CO     NO     CO     NO         **
**                       LOAD  VOL%   VOL%   PPMV   PPMV   PPMV   PPMV   NG/J   NG/J  ACUDE   **
**   DATE      TIME      MWTH  MEAS   MEAS   MEAS   MEAS   3%O2   3%O2                        **
************************************************************************************************
** 8/12/80     1215      .0    8.3    6.9     21     60     29     85      9     46           **
** 8/12/80     1230      .0    7.9    6.9     13     49     17     67      5     36           **
** 8/12/80     1245      .0    6.5    8.1     26     21     32     26     10     14           **
** 8/12/80     1300      .0    6.9    8.0     33     38     42     48     13     26           **
** 8/12/80     1315      .0    6.7    8.3     32     40     40     50     13     27           **
** 8/12/80     1330      .0   -1.0   -1.0     -1     -1      0      0      0      0     C     **
** 8/12/80     1345      .0   -1.0   -1.0     -1     -1      0      0      0      0     C     **
** 8/12/80     1400      .0   -1.0   -1.0     -1     -1      0      0      0      0     C     **
** 8/12/80     1415      .0   -1.0   -1.0     -1     -1      0      0      0      0     C     **
** 8/12/80     1430      .0    6.8    8.0     36     33     45     41     15     22           **
** 8/12/80     1445      .0   -1.0   -1.0     -1     -1      0      0      0      0     C     **
** 8/12/80     1500      .0    8.9    6.5     12     34     17     50      5     27           **
** 8/12/80     1515      .0    6.7    8.1     29     41     36     51     12     28           **
** 8/12/80     1530      .0    7.5    7.4      4     38      5     50      1     27           **
** 8/12/80     1545      .0    6.8    8.0     19     42     24     53      7     28           **
** 8/12/80     1600      .0    8.8    6.4     12     37     17     54      5     29           **
** 8/12/80     1615      .0    6.7    8.1     16     42     20     52      6     28           **
** 8/12/80     1630      .0    9.9    5.1     37     30     60     48     19     26           **
** 8/12/80     1645      .0    9.7    5.8     38     33     60     52     20     28           **
** 8/12/80     1700      .0    8.9    6.3     -1     34     -1     50      0     27     Q     **
** 8/12/80     1715      .0   10.7    4.8      7     29     12     50      4     27           **
** 8/12/80     1730      .0   10.5    4.5     21     28     36     48     11     26           **
** 8/12/80     1745      .0    9.2    6.6      6     35      9     53      3     29           **
** 8/12/80     1800      .0   11.1    4.3     15     27     27     49      9     26           **
** 8/12/80     1815      .0    9.4    5.7     38     34     59     52     19     28           **
** 8/12/80     1830      .0   10.4    5.3      5     31      8     52      2     28           **
** 8/12/80     1845      .0   10.8    4.6     42     29     74     51     24     27           **
** 8/12/80     1900      .0    8.9    6.3      0     34      0     50      0     27           **
** 8/12/80     1915      .0   10.0    4.9     20     29     32     47     10     25           **
** 8/12/80     1930      .0   10.1    5.6      0     32      0     53      0     28           **
** 8/12/80     1945      .0    7.5    7.4     26     39     34     52     11     28           **
** 8/12/80     2000      .0   10.6    4.8     12     30     20     52      6     28           **
** 8/12/80     2015      .0    8.5    6.6     42     36     60     51     20     28           **
** 8/12/80     2030      .0    9.4    5.7     17     32     26     49      8     27           **
** 8/12/80     2045      .0   10.1    5.3     30     32     49     53     16     28           **
** 8/12/80     2100      .0    9.5    5.9     14     34     21     53      7     28           **
** 8/12/80     2115      .0    9.1    6.2     11     36     16     54      5     29           **
** 8/12/80     2130      .0    9.1    6.4     28     36     42     54     14     29           **
** 8/12/80     2145      .0    9.2    6.2      0     36      0     54     14     29           **
** 8/12/80     2200      .0    8.0    7.3     21     40     29     55      9     30           **
** 8/12/80     2215      .0    9.2    6.3      4     36      6     55      2     29           **
** 8/12/80     2230      .0    7.9    7.4     20     40     27     55      9     29           **
** 8/12/80     2245      .0    9.1 [illegible] 37     36     56     54     18     29           **
** 8/12/80     2300      .0    9.0  6.[illegible] 11    36     16     54      5     29           **
** 8/12/80     2315      .0    9.8    5.7     19     35     30     56     10     30           **
** 0/ 0/ 0        0      .0     .0     .0      0      0      0      0      0      0     •     **
** 0/ 0/ 0        0      .0     .0     .0      0      0      0      0      0      0     •     **
** 0/ 0/ 0        0      .0     .0     .0      0      0      0      0      0      0     •     **
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**                                        15 MIN. DATA                                      **
**                              DRY STACK GAS CONCENTRATION                                 **
**                                                                                          **
**                               O2      CO2      CO      NO      CO      NO      CO      NO   ACODE  **
**                      LOAD    VOL%     VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J        **
**   DATE      TIME     MWTH    MEAS     MEAS    MEAS    MEAS    3%O2    3%O2                        **
**********************************************************************************************
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 0/ 0/ 0        0       .0      .0       .0      0       0       0       0       0       0    .     **
** 8/13/80      600       .0     7.1      8.2     54      43      70      55      23      30          **
** 8/13/80      615       .0     7.3      8.1     28      43      36      56      12      30          **
** 8/13/80      630       .0     7.3      8.1     18      43      23      56       7      30          **
** 8/13/80      645       .0     7.0      8.2     27      44      34      56      11      30          **
** 8/13/80      700       .0     6.8      8.4     14      44      17      55       5      30          **
** 8/13/80      715       .0     6.6      8.6     66      44      82      55      27      29          **
** 8/13/80      730       .0     7.1      8.2     17      44      22      57       7      30          **
** 8/13/80      745       .0     6.5      8.6      4      44       4      54       1      29          **
** 8/13/80      800       .0     6.9      8.3     25      44      31      56      10      30          **
** 8/13/80      815       .0     7.0      8.4     14      44      18      56       5      30          **
** 8/13/80      830       .0     7.1      8.2      4      44       5      57       1      30          **
** 8/13/80      845       .0     6.7      8.3     75      43      94      54      31      29          **
** 8/13/80      900       .0     6.9      8.0     48      42      61      53      20      29          **
** 8/13/80      915       .0     6.7      8.2     54      42      68      52      22      28          **
** 8/13/80      930       .0     6.6      8.3     29      42      36      52      11      28          **
** 8/13/80      945       .0     6.7      8.2     41      42      51      52      17      28          **
** 8/13/80     1000       .0     6.5      8.3      8      42       9      52       3      28          **
** 8/13/80     1015       .0     6.2      8.6     22      43      26      52       8      28          **
** 8/13/80     1030       .0     6.4      8.4     29      42      35      51      11      28          **
** 8/13/80     1045       .0     6.3      8.5     20      42      24      51       8      27          **
** 8/13/80     1100       .0     6.7      8.2     28      42      35      52      11      28          **
** 8/13/80     1115       .0     6.8      8.1     28      42      35      53      11      28          **
** 8/13/80     1130       .0     6.5      8.3     56      42      69      52      22      28          **
** 8/13/80     1145       .0     6.8      8.0     41      42      52      53      17      28          **
** 8/13/80     1200       .0     6.8      8.0     24      42      30      53      10      28          **
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****************************************************************************************************
**                                        15 MIN, DATA                                            **
**                               DRY STACK GAS CONCENTRATION                                      **
**                                                                                                **
**                             O2     CO2      CO      NO      CO      NO      CO      NO  ACODE  **
**                   LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J         **
**  DATE      TIME   MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                         **
****************************************************************************************************
** 8/13/80    1215     .0     6.9     8.0      36      42      46      53      15      29         **
** 8/13/80    1230     .0     6.8     8.0      25      42      31      53      10      28         **
** 8/13/80    1245     .0     6.7     8.0      27      42      34      52      11      28         **
** 8/13/80    1300     .0     7.0     7.7      68      39      87      50      28      27         **
** 8/13/80    1315     .0     7.0     7.8      91      40     117      51      38      27         **
** 8/13/80    1330     .0     7.1     7.6      93      40     120      51      39      28         **
** 8/13/80    1345     .0     6.7     7.8      95      40     119      50      39      27         **
** 8/13/80    1400     .0     6.6     8.0      94      42     117      52      38      28         **
** 8/13/80    1415     .0     6.9     9.7      23      67      29      85       9      46         **
** 8/13/80    1430     .0     6.9     7.7      30      37      38      47      12      25         **
** 8/13/80    1445     .0     6.6     7.9      57      38      71      47      23      25         **
** 8/13/80    1500     .0     6.8     7.8       7      38       8      48       2      26         **
** 8/13/80    1515     .0     6.8     7.8      20      40      25      50       8      27         **
** 8/13/80    1530     .0     6.8     7.8      33      42      41      53      13      28         **
** 8/13/80    1545     .0     6.6     7.8      23      42      28      52       9      28         **
** 8/13/80    1600     .0     6.4     7.8      15      31      18      38       6      20         **
** 8/13/80    1615     .0     6.4     7.9      14      11      17      13       5       7         **
** 8/13/80    1630     .0     6.5     7.7      17      43      21      53       6      28         **
** 8/13/80    1645     .0     6.4     7.8      16      43      19      53       6      28         **
** 8/13/80    1700     .0     6.4     7.8      18      43      22      53       7      28         **
** 8/13/80    1715     .0     6.6     7.6      15      42      18      52       6      28         **
** 8/13/80    1730     .0     8.6     5.5      22      34      32      49      10      26         **
** 8/13/80    1745     .0     9.1     5.6      30      36      45      54      15      29         **
** 8/13/80    1800     .0     8.6     5.5      33      34      48      49      15      26         **
** 8/13/80    1815     .0     9.3     5.4      36      34      55      52      18      28         **
** 8/13/80    1830     .0     7.8     6.5       2      37       2      50       0      27         **
** 8/13/80    1845     .0     8.1     6.2      23      36      32      50      10      27         **
** 8/13/80    1900     .0     8.4     5.9      13      36      18      51       6      27         **
** 8/13/80    1915     .0     7.3     7.0      11      40      14      52       4      28         **
** 8/13/80    1930     .0     9.3     5.3      38      34      58      52      19      28         **
** 8/13/80    1945     .0     7.2     7.2       8      41      10      53       3      29         **
** 8/13/80    2000     .0     8.4     6.0       0      36       0      51       0      27         **
** 8/13/80    2015     .0     6.9     7.4       7      41       8      52       2      28         **
** 8/13/80    2030     .0     8.3     6.1       4      37       5      52       1      28         **
** 8/13/80    2045     .0     6.9     7.4       6      41       7      52       2      28         **
** 8/13/80    2100     .0     6.9     7.4       7      41       8      52       2      28         **
** 8/13/80    2115     .0     6.9     7.4       5      41       6      52       2      28         **
** 8/13/80    2130     .0     9.3     5.1      32      33      49      50      16      27         **
** 8/13/80    2145     .0     6.7     7.5       6      41       7      51       2      28         **
** 8/13/80    2200     .0     8.1     6.2       2      37       2      51       0      28         **
** 8/13/80    2215     .0     7.0     7.3       9      42      11      54       3      29         **
** 8/13/80    2230     .0     7.9     7.4       8      42      11      57       3      31         **
** 8/13/80    2245     .0     6.7     7.4       7      41       8      51       2      28         **
** 8/13/80    2300     .0    10.1     4.4       1      31       1      51       0      27         **
** 0/ 0/ 0       0     .0      .0      .0       0       0       0       0       0       0   *     **
** 0/ 0/ 0       0     .0      .0      .0       0       0       0       0       0       0   *     **
** 0/ 0/ 0       0     .0      .0      .0       0       0       0       0       0       0   *     **
** 0/ 0/ 0       0     .0      .0      .0       0       0       0       0       0       0   *     **
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*************************************************************************************************************
**                                                                                                         **
**                                           15 MIN. DATA                                                  **
**                                   DRY STACK GAS CONCENTRATION                                           **
**                                                                                                         **
**                               O2      CO2      CO      NO      CO      NO      CO      NO   ACODE       **
**                      LOAD    VOL%     VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J              **
**   DATE       TIME    MWTH    MEAS     MEAS    MEAS    MEAS    3%O2    3%O2                              **
*************************************************************************************************************
** 8/14/80      1215     .0      6.1      8.4       8      45       9      54       3      29              **
** 8/14/80      1230     .0      5.9      8.5     100      45     119      53      39      29              **
** 8/14/80      1245     .0      6.4      8.2      17      44      20      54       6      29              **
** 8/14/80      1300     .0      6.4      8.2      66      45      81      55      26      30              **
** 8/14/80      1315     .0      5.9      8.6      20      45      23      53       7      29              **
** 8/14/80      1330     .0      6.1      8.3       8      44       9      53       3      28              **
** 8/14/80      1345     .0      6.2      8.4      62      44      75      53      24      29              **
** 8/14/80      1400     .0      6.2      8.4      25      45      30      54      10      29              **
** 8/14/80      1415     .0      6.1      8.4       7      44       8      53       2      28              **
** 8/14/80      1430     .0      6.3      8.2      79      45      96      55      31      29              **
** 8/14/80      1445     .0      6.0      8.5      79      45      94      54      31      29              **
** 8/14/80      1500     .0      6.5      8.1      61      44      75      54      25      29              **
** 8/14/80      1515     .0      6.2      8.2      48      44      58      53      19      29              **
** 8/14/80      1530     .0      6.5      8.0      42      44      52      54      17      29              **
** 8/14/80      1545     .0      6.2      8.2      49      50      59      60      19      33              **
** 8/14/80      1600     .0      6.6      8.1      44      45      55      56      18      30              **
** 8/14/80      1615     .0      6.2      8.3      39      46      47      56      15      30              **
** 8/14/80      1630     .0      6.3      8.3      34      45      41      55      13      29              **
** 8/14/80      1645     .0      6.2      8.3       9      45      10      54       3      29              **
** 8/14/80      1700     .0      6.2      8.3      25      45      30      54      10      29              **
** 8/14/80      1715     .0      6.1      8.4      40      45      48      54      15      29              **
** 8/14/80      1730     .0      6.6      8.1      22      45      27      56       9      30              **
** 8/14/80      1745     .0      6.3      8.3      29      45      35      55      11      29              **
** 8/14/80      1800     .0      6.5      8.0      22      44      27      54       9      29              **
** 8/14/80      1815     .0      6.5      8.1      15      45      18      55       6      30              **
** 8/14/80      1830     .0      6.3      8.2      13      43      15      52       5      28              **
** 8/14/80      1845     .0      6.2      8.3      36      44      43      53      14      29              **
** 8/14/80      1900     .0      6.5      8.2      40      44      49      54      16      29              **
** 8/14/80      1915     .0      6.2      8.3      34      45      41      54      13      29              **
** 8/14/80      1930     .0      6.3      8.3      49      44      60      53      19      29              **
** 8/14/80      1945     .0      6.2      8.3      16      44      19      53       6      29              **
** 8/14/80      2000     .0      6.7      8.0      38      43      47      54      15      29              **
** 8/14/80      2015     .0      7.0      7.8      14      43      18      55       5      30              **
** 8/14/80      2030     .0      6.8      7.9      14      45      17      57       5      30              **
** 8/14/80      2045     .0      6.6      8.0      10      43      12      53       4      29              **
** 8/14/80      2100     .0      6.7      8.0      10      43      12      54       4      29              **
** 8/14/80      2115     .0      6.8      7.9      11      44      13      55       4      30              **
** 8/14/80      2130     .0      7.0      7.8      12      43      15      55       5      30              **
** 8/14/80      2145     .0      7.0      7.8      10      44      12      56       4      30              **
** 8/14/80      2200     .0      7.0      7.8      12      43      15      55       5      30              **
** 8/14/80      2215     .0      6.9      7.8      14      43      17      54       5      29              **
** 8/14/80      2230     .0      7.1      7.8       2      43       2      55       0      30              **
** 8/14/80      2245     .0      6.8      7.9      11      43      13      54       4      29              **
** 8/14/80      2300     .0      6.9      7.8      13      43      16      54       5      29              **
** 0/ 0/ 0         0     .0       .0       .0       0       0       0       0       0       0    *         **
** 0/ 0/ 0         0     .0       .0       .0       0       0       0       0       0       0    *         **
** 0/ 0/ 0         0     .0       .0       .0       0       0       0       0       0       0    *         **
** 0/ 0/ 0         0     .0       .0       .0       0       0       0       0       0       0    *         **
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**                                                                                                       **
**                                         15 MIN. DATA                                                  **
**                                 DRY STACK GAS CONCENTRATION                                           **
**                                                                                                       **
**                             O2       CO2      CO       NO       CO       NO                           **
**                     LOAD    VOL%     VOL%     PPMV     PPMV     PPMV     PPMV     CO      NO   ACODE  **
**   DATE      TIME    MWTH    MEAS     MEAS     MEAS     MEAS     3%O2     3%O2     NG/J    NG/J        **
***********************************************************************************************************
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 0/ 0/ 0        0     .0      .0       .0        0        0        0        0       0       0    *     **
** 8/14/80      515     .0     9.6      4.8       22       31       34       49      11      26          **
** 8/14/80      530     .0     8.5      6.2       23       37       33       53      10      28          **
** 8/14/80      545     .0     6.8      7.5       33       41       41       52      13      28          **
** 8/14/80      600     .0     5.9      8.2       25       43       29       51       9      27          **
** 8/14/80      615     .0     6.2      8.0       62       42       75       51      24      27          **
** 8/14/80      630     .0     6.3      8.0        9       42       11       51       3      27          **
** 8/14/80      645     .0     5.9      8.3       17       44       20       52       6      28          **
** 8/14/80      700     .0     6.0      8.3        5       44        6       52       1      28          **
** 8/14/80      715     .0     5.6      8.4        7       44        8       51       2      27          **
** 8/14/80      730     .0     5.9      8.3       19       44       22       52       7      28          **
** 8/14/80      745     .0     5.6      8.4       11       44       12       51       4      27          **
** 8/14/80      800     .0     5.7      8.4       24       44       28       51       9      28          **
** 8/14/80      815     .0     5.8      8.2       11       44       13       52       4      28          **
** 8/14/80      830     .0     6.0      8.1        0       44        0       52       0      28          **
** 8/14/80      845     .0     6.0      8.1       31       44       37       52      12      28          **
** 8/14/80      900     .0     6.2      8.0       32       44       38       53      12      29          **
** 8/14/80      915     .0     5.8      8.3        2       44        2       52       0      28          **
** 8/14/80      930     .0     5.7      8.4       41       45       48       52      15      28          **
** 8/14/80      945     .0     6.2      7.9       30       44       36       53      12      29          **
** 8/14/80     1000     .0     6.2      7.9       42       43       51       52      16      28          **
** 8/14/80     1015     .0     6.2      8.0       39       44       47       53      15      29          **
** 8/14/80     1030     .0     6.3      8.3       57       44       69       53      23      29          **
** 8/14/80     1045     .0     6.4      8.3       11       53       13       65       4      35          **
** 8/14/80     1100     .0     5.9      8.6       15       45       17       53       5      29          **
** 8/14/80     1115     .0     5.8      8.6       17       44       20       52       6      28          **
** 8/14/80     1130     .0     5.9      8.6       11       45       13       53       4      29          **
** 8/14/80     1145     .0     6.1      8.4       31       45       37       54      12      29          **
** 8/14/80     1200     .0     6.0      8.5       56       45       67       54      22      29          **
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**                                      15 MIN. DATA                                             **
**                               DRY STACK GAS CONCENTRATION                                     **
**                                                                                               **
**                                  O2      CO2      CO       NO       CO       NO      CO      NO    ACODE   **
**                          LOAD   VOL%     VOL%     PPMV     PPMV     PPMV     PPMV    NG/J    NG/J          **
**   DATE         TIME      MWTH   MEAS     MEAS     MEAS     MEAS     3%O2     3%O2                          **
***************************************************************************************************
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 0/ 0/ 0          0        .0     .0       .0        0        0        0        0       0       0    *       **
** 8/15/80        545        .0    6.8      8.0       57       43       72       54      23      29            **
** 8/15/80        600        .0    5.5      9.0       27       46       31       53      10      29            **
** 8/15/80        615        .0    5.8      8.7       14       42       16       49       5      27            **
** 8/15/80        630        .0    6.3      8.5       10       45       12       55       4      29            **
** 8/15/80        645        .0    6.1      8.5       28       45       33       54      11      29            **
** 8/15/80        700        .0    6.5      8.3       57       43       70       53      23      28            **
** 8/15/80        715        .0    6.1      8.5        1       43        1       52       0      28            **
** 8/15/80        730        .0    6.0      8.7       15       45       18       54       5      29            **
** 8/15/80        745        .0    6.1      8.6        9       45       10       54       3      29            **
** 8/15/80        800        .0    5.9      8.7       25       45       29       53       9      29            **
** 8/15/80        815        .0    5.6      8.9       20       46       23       53       7      29            **
** 8/15/80        830        .0    6.0      8.6        6       45        7       54       2      29            **
** 8/15/80        845        .0    5.9      8.7       10       46       11       54       3      29            **
** 8/15/80        900        .0    6.4      8.4       58       45       71       55      23      30            **
** 8/15/80        915        .0    5.8      8.7       16       45       18       53       6      28            **
** 8/15/80        930        .0    5.3      8.9       35       44       40       50      13      27            **
** 8/15/80        945        .0    5.2      9.0       37       45       42       51      13      27            **
** 8/15/80       1000        .0    4.9      9.1       43       45       48       50      15      27            **
** 8/15/80       1015        .0    5.9      8.5       24       43       28       51       9      27            **
** 8/15/80       1030        .0    6.5      8.2       19       43       23       53       7      28            **
** 8/15/80       1045        .0    6.3      8.4       32       44       39       53      12      29            **
** 8/15/80       1100        .0    5.9      8.5        8       44        9       52       3      28            **
** 8/15/80       1115        .0    6.6      8.1       54       44       67       55      22      29            **
** 8/15/80       1130        .0    6.8      7.9       59       43       74       54      24      29            **
** 8/15/80       1145        .0    6.3      8.3       65       43       79       52      26      28            **
** 8/15/80       1200        .0    6.4      8.2       58       44       71       54      23      29            **
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**
**                                     15 MIN. DATA                                       **
**                             DRY STACK GAS CONCENTRATION                                **
**                                                                                        **
**                            O2    CO2     CO     NO     CO     NO     CO     NO  ACODE    **
**                 LOAD   VOL%   VOL%   PPMV   PPMV   PPMV   PPMV   NG/J   NG/J           **
**   DATE    TIME  MWTH   MEAS   MEAS   MEAS   MEAS   3%O2   3%O2                         **
********************************************************************************************
** 8/15/80   1215    .0    5.5    8.8     10     46     11     53      3     29           **
** 8/15/80   1230    .0    5.6    8.7     30     46     35     53     11     29           **
** 8/15/80   1245    .0    6.4    8.2     36     45     44     55     14     30           **
** 8/15/80   1300    .0    6.2    8.2     24     46     29     56      9     30           **
** 8/15/80   1315    .0    6.8    7.9     35     45     44     57     14     30           **
** 8/15/80   1330    .0    7.0    7.8     18     44     23     56      7     30           **
** 8/15/80   1345    .0    6.6    8.0     17     45     21     56      7     30           **
** 8/15/80   1400    .0    8.2    6.6     26     39     36     54     12     29           **
** 8/15/80   1415    .0    8.4    6.5     41     39     58     55     19     30           **
** 8/15/80   1430    .0    9.1    5.6     46     35     69     53     23     28           **
** 8/15/80   1445    .0    7.3    7.7     32     43     42     56     13     30           **
** 8/15/80   1500    .0    6.5    7.9     18     44     22     54      7     29           **
** 8/15/80   1515    .0    6.7    8.0     23     45     28     56      9     30           **
** 8/15/80   1530    .0    6.7    7.9     14     44     17     55      5     30           **
** 8/15/80   1545    .0    6.6    8.0     13     45     16     56      5     30           **
** 8/15/80   1600    .0    6.9    7.7     18     44     23     56      7     30           **
** 8/15/80   1615    .0    6.9    7.7     15     44     19     56      6     30           **
** 8/15/80   1630    .0    8.5    6.4     29     39     41     56     13     30           **
** 8/15/80   1645    .0    8.6    6.4     32     39     46     56     15     30           **
** 8/15/80   1700    .0    7.3    7.4     15     43     19     56      6     30           **
** 8/15/80   1715    .0    8.4    6.6     32     39     45     55     15     30           **
** 8/15/80   1730    .0    9.2    5.6     40     34     61     52     20     28           **
** 8/15/80   1745    .0    9.8    5.5      3     35      4     56      1     30           **
** 8/15/80   1800    .0    9.8    5.2     47     33     75     53     25     28           **
** 8/15/80   1815    .0    6.6    7.8     13     43     16     53      5     29           **
** 8/15/80   1830    .0    8.4    6.4     28     37     40     52     13     28           **
** 8/15/80   1845    .0    6.7    7.8     14     43     17     54      5     29           **
** 8/15/80   1900    .0    8.6    6.3      6     38      8     55      2     29           **
** 8/15/80   1915    .0    7.2    7.5     16     42     20     54      6     29           **
** 8/15/80   1930    .0    7.0    7.7     15     42     19     54      6     29           **
** 8/15/80   1945    .0    6.7    7.9     14     42     17     52      5     28           **
** 8/15/80   2000    .0    6.8    7.8     14     42     17     53      5     28           **
** 8/15/80   2015    .0    6.6    8.0     13     42     16     52      5     28           **
** 8/15/80   2030    .0    6.6    7.9     17     42     21     52      7     28           **
** 8/15/80   2045    .0    6.9    7.8     15     43     19     54      6     29           **
** 8/15/80   2100    .0    6.8    7.9     13     43     16     54      5     29           **
** 8/15/80   2115    .0    6.8    7.9     21     43     26     54      8     29           **
** 8/15/80   2130    .0    6.9    7.8     24     43     30     54     10     29           **
** 8/15/80   2145    .0    7.0    7.8     24     43     30     55     10     30           **
** 8/15/80   2200    .0    7.0    7.8     23     43     29     55      9     30           **
** 8/15/80   2215    .0    6.9    7.9     30     44     38     56     12     30           **
** 8/15/80   2230    .0    6.8    7.9     27     43     34     54     11     29           **
** 8/15/80   2245    .0    6.9    7.8     18     43     23     54      7     29           **
** 8/15/80   2300    .0    7.1    7.7     13     42     16     54      5     29           **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0      0      0   *       **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0      0      0   *       **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0      0      0   *       **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0      0      0   *       **
********************************************************************************************
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*****************************************************************************************************
**                                        15 MIN. DATA                                              **
**                                 DRY STACK GAS CONCENTRATION                                      **
**                                                                                                  **
**                                 O2     CO2     CO     NO     CO     NO     CO     NO   ACODE     **
**                         LOAD   VOL%    VOL%   PPMV   PPMV   PPMV   PPMV   NG/J   NG/J            **
**                         MWTH   MEAS    MEAS   MEAS   MEAS   3%O2   3%O2                          **
**   DATE          TIME                                                                             **
*****************************************************************************************************
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 0/ 0/ 0          0      .0      .0      .0      0      0      0      0      0      0    *         **
** 8/18/80        530      .0     8.0     7.4      5     40      6     55      2     30              **
** 8/18/80        545      .0     6.6     8.2     13     41     16     51      5     27              **
** 8/18/80        600      .0     6.7     8.0     11     40     13     50      4     27              **
** 8/18/80        615      .0     6.8     8.1     36     42     45     53     15     28              **
** 8/18/80        630      .0     6.5     8.4      0     43      0     53      0     28              **
** 8/18/80        645      .0    -1.0    -1.0     -1     -1      0      0      0      0    C         **
** 8/18/80        700      .0    -1.0    -1.0     -1     -1      0      0      0      0    C         **
** 8/18/80        715      .0    -1.0    -1.0     -1     -1      0      0      0      0    C         **
** 8/18/80        730      .0     5.8     8.4    343     43    406     50    134     27              **
** 8/18/80        745      .0     3.8     9.7      1     46      1     48      0     26              **
** 8/18/80        800      .0     5.5     8.9     27     44     31     51     10     27              **
** 8/18/80        815      .0     6.1     8.6      3     43      3     52      1     28              **
** 8/18/80        830      .0     6.1     8.6     16     42     19     50      6     27              **
** 8/18/80        845      .0     6.1     8.6     30     43     36     52     11     28              **
** 8/18/80        900      .0     6.4     8.2     10     42     12     51      4     28              **
** 8/18/80        915      .0     6.7     8.0     55     42     69     52     22     28              **
** 8/18/80        930      .0     6.9     7.8     62     41     79     52     26     28              **
** 8/18/80        945      .0     7.0     7.7     45     42     57     54     19     29              **
** 8/18/80       1000      .0     6.8     7.9     82     42    104     53     34     28              **
** 8/18/80       1015      .0     7.0     7.8     48     42     61     54     20     29              **
** 8/18/80       1030      .0     7.6     7.2      2     40      2     53      0     29              **
** 8/18/80       1045      .0     6.8     7.9     32     42     40     53     13     28              **
** 8/18/80       1100      .0     6.9     7.8     46     42     58     53     19     29              **
** 8/18/80       1115      .0     6.7     8.0     82     43    103     54     34     29              **
** 8/18/80       1130      .0     6.3     8.2     97     44    118     53     39     29              **
** 8/18/80       1145      .0     6.3     8.2     49     44     60     53     19     29              **
** 8/18/80       1200      .0     6.9     7.7     64     42     81     53     27     29              **
*****************************************************************************************************
```

15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	CO PPMV MEAS	NO PPMV MEAS	CO PPMV 3%O2	NO PPMV 3%O2	CO NG/J	NO NG/J	ACUDE
8/18/80	1215	.0	7.3	7.4	26	41	34	53	11	29	
8/18/80	1230	.0	7.3	7.4	38	41	50	53	16	29	
8/18/80	1245	.0	7.6	7.3	40	42	53	56	17	30	
8/18/80	1300	.0	7.7	7.1	25	42	33	56	11	30	
8/18/80	1315	.0	7.5	7.3	33	42	44	56	14	30	
8/18/80	1330	.0	7.7	7.1	32	42	43	56	14	30	
8/18/80	1345	.0	7.4	7.3	28	42	37	55	12	30	
8/18/80	1400	.0	7.3	7.4	25	41	32	53	10	29	
8/18/80	1415	.0	7.2	7.5	23	42	30	54	9	29	
8/18/80	1430	.0	7.4	7.2	23	41	30	54	10	29	
8/18/80	1445	.0	7.4	7.4	30	41	39	54	13	29	
8/18/80	1500	.0	7.3	7.4	24	42	31	55	10	29	
8/18/80	1515	.0	7.0	7.6	23	42	29	54	9	29	
8/18/80	1530	.0	9.3	5.6	33	35	50	54	16	29	
8/18/80	1545	.0	7.6	7.1	22	41	29	55	9	29	
8/18/80	1600	.0	9.5	5.5	3	35	4	54	1	29	
8/18/80	1615	.0	9.0	5.8	26	34	39	51	12	27	
8/18/80	1630	.0	9.7	5.2	12	32	19	51	6	27	
8/18/80	1645	.0	10.9	4.1	6	28	10	50	3	27	
8/18/80	1700	.0	10.7	4.1	20	28	35	49	11	26	
8/18/80	1715	.0	9.0	6.0	9	35	13	52	4	28	
8/18/80	1730	.0	9.2	5.7	32	34	48	52	16	28	
8/18/80	1745	.0	11.4	3.4	20	27	37	50	12	27	
8/18/80	1800	.0	9.1	5.9	11	34	16	51	5	27	
8/18/80	1815	.0	10.5	4.5	26	29	44	49	14	27	
8/18/80	1830	.0	9.4	5.4	20	32	31	49	10	27	
8/18/80	1845	.0	8.6	6.2	21	36	30	52	10	28	
8/18/80	1900	.0	7.1	7.5	23	39	29	50	9	27	
8/18/80	1915	.0	7.1	7.6	34	40	44	51	14	28	
8/18/80	1930	.0	7.0	7.7	3	39	3	50	1	27	
8/18/80	1945	.0	6.9	7.8	54	-1	69	-1	22	0	D
8/18/80	2000	.0	6.5	8.0	15	-1	18	-1	6	0	D
8/18/80	2015	.0	6.6	8.0	8	-1	10	-1	3	0	D
8/18/80	2030	.0	6.4	8.1	32	-1	39	-1	13	0	D
8/18/80	2045	.0	6.5	8.0	22	-1	27	-1	9	0	D
8/18/80	2100	.0	6.9	7.8	1	-1	1	-1	0	0	D
8/18/80	2115	.0	6.5	8.0	10	-1	12	-1	4	0	D
8/18/80	2130	.0	6.9	7.9	10	-1	12	-1	4	0	D
8/18/80	2145	.0	6.5	8.1	12	-1	14	-1	4	0	D
8/18/80	2200	.0	7.0	7.9	20	-1	25	-1	8	0	D
8/18/80	2215	.0	6.7	8.0	30	-1	37	-1	12	0	D
8/18/80	2230	.0	6.7	8.0	11	-1	13	-1	4	0	D
8/18/80	2245	.0	6.7	8.0	10	-1	12	-1	4	0	D
8/18/80	2300	.0	6.7	7.9	16	-1	20	-1	6	0	D
0/ 0/ 0	0	.0	.0	.0	0	0	0	0	0	0	*
0/ 0/ 0	0	.0	.0	.0	0	0	0	0	0	0	*
0/ 0/ 0	0	.0	.0	.0	0	0	0	0	0	0	*
0/ 0/ 0	0	.0	.0	.0	0	0	0	0	0	0	*

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****************************************************************************************************
**                                          15 MIN. DATA                                          **
**                                  DRY STACK GAS CONCENTRATION                                   **
**                                                                                                **
**                              O2      CO2      CO       NO       CO       NO      CO      NO  ACODE **
**                     LOAD    VOL%    VOL%     PPMV     PPMV     PPMV     PPMV    NG/J    NG/J     **
**    DATE     TIME    MWTH    MEAS    MEAS     MEAS     MEAS     3%O2     3%O2                     **
****************************************************************************************************
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 0/ 0/ 0        0      .0      .0      .0        0        0        0        0       0       0   *  **
** 8/19/80      900      .0     6.4     8.1       53       45       65       55      21      30      **
** 8/19/80      915      .0     6.5     8.0       41       45       50       55      16      30      **
** 8/19/80      930      .0     6.5     8.0       46       45       57       55      18      30      **
** 8/19/80      945      .0     6.6     8.0       51       46       63       57      21      31      **
** 8/19/80     1000      .0     6.4     8.1       37       45       45       55      15      30      **
** 8/19/80     1015      .0     6.5     8.1       43       46       53       57      17      31      **
** 8/19/80     1030      .0     6.3     8.2       52       45       63       55      21      29      **
** 8/19/80     1045      .0     6.6     8.1       46       46       57       57      19      31      **
** 8/19/80     1100      .0     6.4     8.3       67       47       82       58      27      31      **
** 8/19/80     1115      .0     6.5     8.1       54       47       67       58      22      31      **
** 8/19/80     1130      .0     6.3     8.1       35       46       42       56      14      30      **
** 8/19/80     1145      .0     6.5     8.0       31       47       38       58      12      31      **
** 8/19/80     1200      .0     8.3     6.6       54       42       76       59      25      32      **
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*******************************************************************************************
**                                                                                       **
**                                  15 MIN, DATA                                         **
**                          DRY STACK GAS CONCENTRATION                                  **
**                                                                                       **
**                             O2      CO2     CO     NO     CO     NO     CO     NO  ACODE **
**                    LOAD    VOL%    VOL%    PPMV   PPMV   PPMV   PPMV   NG/J   NG/J      **
**   DATE     TIME    MWTH    MEAS    MEAS    MEAS   MEAS   3%O2   3%O2                    **
*******************************************************************************************
** 8/19/80    1215     .0      6.7     8.0     29     46     36     57     12     31        **
** 8/19/80    1230     .0      6.4     8.0     26     45     32     55     10     30        **
** 8/19/80    1245     .0     -1.0    -1.0     -1     -1      0      0      0      0   C    **
** 8/19/80    1300     .0     -1.0    -1.0     -1     -1      0      0      0      0   C    **
** 8/19/80    1315     .0     -1.0    -1.0     -1     -1      0      0      0      0   C    **
** 8/19/80    1330     .0     -1.0    -1.0     -1     -1      0      0      0      0   C    **
** 8/19/80    1345     .0      6.2     8.2     19     45     23     54      7     29        **
** 8/19/80    1400     .0      6.8     7.8     21     44     26     55      8     30        **
** 8/19/80    1415     .0      8.7     6.2     33     38     48     55     15     30        **
** 8/19/80    1430     .0      8.3     6.4      8     34     11     48      3     26        **
** 8/19/80    1445     .0      6.3     8.1     21     43     25     52      8     28        **
** 8/19/80    1500     .0      7.9     6.9     32     40     44     55     14     29        **
** 8/19/80    1515     .0      6.7     7.8     19     42     23     52      7     28        **
** 8/19/80    1530     .0      7.9     6.8     31     38     42     52     14     28        **
** 8/19/80    1545     .0      9.7     5.3     43     33     68     52     22     28        **
** 8/19/80    1600     .0      8.6     6.1     38     36     55     52     18     28        **
** 8/19/80    1615     .0      6.6     7.9     21     43     26     53      8     29        **
** 8/19/80    1630     .0      7.9     6.8     32     38     44     52     14     28        **
** 8/19/80    1645     .0      6.7     7.8     19     42     23     52      7     28        **
** 8/19/80    1700     .0      6.8     7.8     19     42     24     53      7     28        **
** 8/19/80    1715     .0      6.8     7.8     17     42     21     53      7     28        **
** 8/19/80    1730     .0      8.6     6.2     30     35     43     50     14     27        **
** 8/19/80    1745     .0     11.2     3.6     18     26     33     47     10     26        **
** 8/19/80    1800     .0      9.2     5.7     55     34     84     52     27     28        **
** 8/19/80    1815     .0     10.6     4.3     30     30     52     52     17     28        **
** 8/19/80    1830     .0     10.9     3.6     24     26     42     46     14     25        **
** 8/19/80    1845     .0     10.6     4.7     30     31     52     53     17     29        **
** 8/19/80    1900     .0     10.9     3.6     25     26     44     46     14     25        **
** 8/19/80    1915     .0     10.3     5.1     34     33     57     55     18     30        **
** 8/19/80    1930     .0      9.1     5.8      4     35      6     53      2     28        **
** 8/19/80    1945     .0      9.2     5.7     11     35     16     53      5     29        **
** 8/19/80    2000     .0      9.3     5.4     40     32     61     49     20     26        **
** 8/19/80    2015     .0     10.2     4.8     25     32     41     53     13     29        **
** 8/19/80    2030     .0      8.5     6.3     36     36     51     51     17     28        **
** 8/19/80    2045     .0      8.7     6.1      6     36      8     52      2     28        **
** 8/19/80    2100     .0      8.8     6.0     34     35     50     51     16     28        **
** 8/19/80    2115     .0      9.8     5.1     22     32     35     51     11     27        **
** 8/19/80    2130     .0      8.7     6.1     26     36     38     52     12     28        **
** 8/19/80    2145     .0      7.2     7.5     18     42     23     54      7     29        **
** 8/19/80    2200     .0      8.7     6.2      9     36     13     52      4     28        **
** 8/19/80    2215     .0      8.4     6.5     32     38     45     54     15     29        **
** 8/19/80    2230     .0      8.5     6.4     28     38     40     54     13     29        **
** 8/19/80    2245     .0      7.1     7.6     19     42     24     54      8     29        **
** 8/19/80    2300     .0      8.4     6.5     29     37     41     52     13     28        **
** 0/ 0/ 0       0     .0       .0      .0      0      0      0      0      0      0   ●    **
** 0/ 0/ 0       0     .0       .0      .0      0      0      0      0      0      0   ●    **
** 0/ 0/ 0       0     .0       .0      .0      0      0      0      0      0      0   ●    **
** 0/ 0/ 0       0     .0       .0      .0      0      0      0      0      0      0   ●    **
*******************************************************************************************
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*******************************************************************************************************
**                                          15 MIN. DATA                                             **
**                                  DRY STACK GAS CONCENTRATION                                      **
**                                                                                                   **
**                                O2       CO2      CO       NO.      CO      NO       CO      NO   ACODE  **
**                       LOAD    VOL%     VOL%     PPMV     PPMV     PPMV    PPMV     NG/J    NG/J         **
**   DATE        TIME    MWTH    MEAS     MEAS     MEAS     MEAS     3%O2    3%O2                          **
*******************************************************************************************************
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 0/ 0/ 0         0      .0       .0       .0       0        0        0       0        0       0    •    **
** 8/20/80       515      .0      6.0      8.7       6       46        7      55        2      29         **
** 8/20/80       530      .0      6.2      8.4      28       45       34      54       11      29         **
** 8/20/80       545      .0      5.3      9.0      52       47       59      53       19      29         **
** 8/20/80       600      .0      4.4      9.4      32       47       34      50       11      27         **
** 8/20/80       615      .0      4.6      9.4       9       47        9      51        3      27         **
** 8/20/80       630      .0      4.6      9.4      52       48       57      52       18      28         **
** 8/20/80       645      .0      5.6      8.8     138       45      161      52       53      28         **
** 8/20/80       700      .0      4.3      9.5       6       48        6      51        2      28         **
** 8/20/80       715      .0      5.4      9.1      12       47       13      54        4      29         **
** 8/20/80       730      .0      5.3      9.0      28       47       32      53       10      29         **
** 8/20/80       745      .0      5.2      9.1      34       47       38      53       12      29         **
** 8/20/80       800      .0      5.0      9.2      31       47       34      52       11      28         **
** 8/20/80       815      .0      5.9      8.7       6       46        7      54        2      29         **
** 8/20/80       830      .0      5.9      8.7       6       46        7      54        2      29         **
** 8/20/80       845      .0      5.8      8.8      22       46       26      54        8      29         **
** 8/20/80       900      .0      6.1      8.5      30       44       36      53       11      28         **
** 8/20/80       915      .0      5.9      8.7      39       46       46      54       15      29         **
** 8/20/80       930      .0      6.5      8.2      50       44       62      54       20      29         **
** 8/20/80       945      .0     -1.0     -1.0      -1       -1        0       0        0       0    C    **
** 8/20/80      1000      .0      6.6      8.1      69       43       86      53       28      29         **
** 8/20/80      1015      .0      6.6      8.1      59       42       73      52       24      28         **
** 8/20/80      1030      .0      6.9      7.8      35       41       44      52       14      28         **
** 8/20/80      1045      .0      6.9      7.9      38       42       48      53       16      29         **
** 8/20/80      1100      .0      6.3      8.2      53       42       64      51       21      27         **
** 8/20/80      1115      .0      8.4      6.6      30       37       42      52       14      28         **
** 8/20/80      1130      .0      7.1      7.6      28       41       36      53       11      28         **
** 8/20/80      1145      .0      6.9      7.8      18       42       23      53        7      29         **
** 8/20/80      1200      .0      6.9      7.7      19       42       24      53        8      29         **
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**                                                                                              
**                                     15 MIN. DATA                                           **
**                            DRY STACK GAS CONCENTRATION                                     **
**                                                                                            **
**                              O2     CO2     CO      NO      CO      NO      CO      NO     **
**                     LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J  ACODE **
**   DATE      TIME    MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                   **
*************************************************************************************************
** 8/20/80     1215     .0      7.0     7.7     18      42      23      54       7      29        **
** 8/20/80     1230     .0      6.9     7.8     24      41      30      52      10      28        **
** 8/20/80     1245     .0      7.1     7.6     18      39      23      50       7      27        **
** 8/20/80     1300     .0      8.8     6.1     37      34      54      50      18      27        **
** 8/20/80     1315     .0      8.4     6.5     12      36      17      51       5      27        **
** 8/20/80     1330     .0      8.0     6.7     19      39      26      54       8      29        **
** 8/20/80     1345     .0      8.7     6.4     26      39      38      57      12      31        **
** 8/20/80     1400     .0      8.9     6.7     24      39      35      58      11      31        **
** 8/20/80     1415     .0     10.1     5.2     30      34      49      56      16      30        **
** 8/20/80     1430     .0     10.0     5.3     32      34      52      55      17      30        **
** 8/20/80     1445     .0      7.0     7.7     12      42      15      54       5      29        **
** 8/20/80     1500     .0      9.6     5.6     42      35      66      55      21      30        **
** 8/20/80     1515     .0      8.4     6.5     38      38      54      54      17      29        **
** 8/20/80     1530     .0      9.5     5.7     50      36      78      56      25      30        **
** 8/20/80     1545     .0      6.8     7.9     11      44      13      55       4      30        **
** 8/20/80     1600     .0      8.1     6.9     24      40      33      55      11      30        **
** 8/20/80     1615     .0      7.0     7.8      9      44      11      56       3      30        **
** 8/20/80     1630     .0      6.8     7.9     12      44      15      55       5      30        **
** 8/20/80     1645     .0     10.8     4.7     22      32      38      56      12      30        **
** 8/20/80     1700     .0      6.8     7.8     14      44      17      55       5      30        **
** 8/20/80     1715     .0      7.4     7.5     21      43      27      57       9      30        **
** 8/20/80     1730     .0      9.4     5.7     27      35      42      54      13      29        **
** 8/20/80     1745     .0      7.1     7.6     12      42      15      54       5      29        **
** 8/20/80     1800     .0     11.3     3.8      5      28       9      52       3      28        **
** 8/20/80     1815     .0      9.2     6.2     28      37      42      56      14      30        **
** 8/20/80     1830     .0     10.6     4.4     23      30      39      52      13      28        **
** 8/20/80     1845     .0      9.8     5.7     30      34      48      54      15      29        **
** 8/20/80     1900     .0     10.7     4.2     11      27      19      47       6      25        **
** 8/20/80     1915     .0      9.5     5.9     27      33      42      51      13      28        **
** 8/20/80     1930     .0     10.2     5.5     33      32      55      53      18      29        **
** 8/20/80     1945     .0      8.9     6.3     22      36      32      53      10      29        **
** 8/20/80     2000     .0      8.6     6.5     22      36      32      52      10      28        **
** 8/20/80     2015     .0     10.2     5.1     43      32      71      53      23      29        **
** 8/20/80     2030     .0      9.8     5.5     36      32      58      51      19      27        **
** 8/20/80     2045     .0      8.2     6.8     25      37      35      52      11      28        **
** 8/20/80     2100     .0      8.9     6.2     19      36      28      53       9      29        **
** 8/20/80     2115     .0      7.7     7.3     15      40      20      54       6      29        **
** 8/20/80     2130     .0      7.8     7.2     12      40      16      54       5      29        **
** 8/20/80     2145     .0      7.3     7.6     11      40      14      52       4      28        **
** 8/20/80     2200     .0      7.4     7.5     13      40      17      53       5      28        **
** 8/20/80     2215     .0      7.4     7.5     13      40      17      53       5      28        **
** 8/20/80     2230     .0      7.3     7.5     14      40      18      52       6      28        **
** 8/20/80     2245     .0      7.3     7.6     16      40      21      52       6      28        **
** 8/20/80     2300     .0      7.7     7.4     11      40      14      54       4      29        **
** 0/ 0/ 0        0     .0       .0      .0      0       0       0       0       0       0   •    **
** 0/ 0/ 0        0     .0       .0      .0      0       0       0       0       0       0   •    **
** 0/ 0/ 0        0     .0       .0      .0      0       0       0       0       0       0   •    **
** 0/ 0/ 0        0     .0       .0      .0      0       0       0       0       0       0   •    **
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*****************************************************************************************************
**                                          15 MIN. DATA                                           **
**                                   DRY STACK GAS CONCENTRATION                                   **
**                                                                                                 **
**                             O2     CO2      CO      NO      CO      NO      CO      NO ACUDE    **
**                   LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J          **
**    DATE    TIME  MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                          **
*****************************************************************************************************
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 0/ 0/ 0        0    .0      .0      .0       0       0       0       0       0       0  •       **
** 8/21/80      515    .0     6.7     8.1      24      43      30      54       9      29          **
** 8/21/80      530    .0     7.2     7.8       9      43      11      56       3      30          **
** 8/21/80      545    .0     6.4     8.3       3      44       3      54       1      29          **
** 8/21/80      600    .0     4.7     9.2       0      45       0      49       0      26          **
** 8/21/80      615    .0     5.2     9.0       7      45       7      51       2      27          **
** 8/21/80      630    .0     5.3     9.0      15      46      17      52       5      28          **
** 8/21/80      645    .0     4.9     9.2       0      47       0      52       0      28          **
** 8/21/80      700    .0     5.0     9.1       1      47       1      52       0      28          **
** 8/21/80      715    .0     5.3     9.0       0      46       0      52       0      28          **
** 8/21/80      730    .0     5.7     8.8      12      46      14      54       4      29          **
** 8/21/80      745    .0     5.9     8.6      12      45      14      53       4      29          **
** 8/21/80      800    .0     6.2     8.6      12      45      14      54       4      29          **
** 8/21/80      815    .0     6.3     8.5      12      45      14      55       4      29          **
** 8/21/80      830    .0     6.8     8.2      16      44      20      55       6      30          **
** 8/21/80      845    .0     6.8     8.1      57      43      72      54      23      29          **
** 8/21/80      900    .0     7.3     7.8      45      42      59      55      19      29          **
** 8/21/80      915    .0     7.1     8.0      28      44      36      57      11      30          **
** 8/21/80      930    .0     7.1     7.9      30      43      38      55      12      30          **
** 8/21/80      945    .0     7.0     7.9      36      44      46      56      15      30          **
** 8/21/80     1000    .0     7.0     7.9      15      44      19      56       6      30          **
** 8/21/80     1015    .0     6.6     8.1      24      44      30      55       9      29          **
** 8/21/80     1030    .0     6.9     8.0      15      44      19      56       6      30          **
** 8/21/80     1045    .0     7.1     7.8      14      43      18      55       5      30          **
** 8/21/80     1100    .0     8.5     6.6       0      38       0      54       0      29          **
** 8/21/80     1115    .0     7.9     6.8      18      40      24      55       8      29          **
** 8/21/80     1130    .0     7.8     7.5      13      43      17      58       5      31          **
** 8/21/80     1145    .0     6.5     8.1      16      44      19      54       6      29          **
** 8/21/80     1200    .0     8.0     6.9      36      39      49      54      16      29          **
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***************************************************************************************************
**                                                                                                **
**                                         15 MIN, DATA                                           **
**                                 DRY STACK GAS CONCENTRATION                                    **
**                                                                                                **
**                              O2      CO2    . CO     NO      CO      NO                        **
**                      LOAD   VOL%    VOL%    PPMV    PPMV    PPMV    PPMV     CO      NO  ACODE **
**   DATE     -TIME     MWTH   MEAS    MEAS    MEAS    MEAS    3%O2    3%O2    NG/J    NG/J       **
***************************************************************************************************
** 8/21/80     1215      .0     6.5     8.1     15      44      18      54       6      29        **
** 8/21/80     1230      .0     8.2     6.9     32      40      45      56      14      30        **
** 8/21/80     1245      .0     6.6     8.0     16      43      20      53       6      29        **
** 8/21/80     1300      .0     8.6     6.5     35      38      50      55      16      29        **
** 8/21/80     1315      .0     9.9     5.2     11      33      17      53       5      29        **
** 8/21/80     1330      .0    -1.0    -1.0     -1      -1       0       0       0       0   C    **
** 8/21/80     1345      .0     8.2     6.7     36      38      50      53      16      29        **
** 8/21/80     1400      .0     9.0     6.2      0      41       0      61       0      33        **
** 8/21/80     1415      .0    10.0     5.6     37      38      60      62      20      33        **
** 8/21/80     1430      .0     8.8     6.1      6      40       8      59       2      32        **
** 8/21/80     1445      .0     8.3     6.7     28      42      39      59      13      32        **
** 8/21/80     1500      .0     6.4     8.1     16      46      19      56       6      30        **
** 8/21/80     1515      .0     6.3     8.2      9      47      11      57       3      31        **
** 8/21/80     1530      .0     8.0     6.9     32      43      44      59      14      32        **
** 8/21/80     1545      .0     6.2     8.3     10      47      12      57       4      31        **
** 8/21/80     1600      .0     8.3     6.7     20      40      28      56       9      30        **
** 8/21/80     1615      .0     7.8     7.1     22      40      30      54       9      29        **
** 8/21/80     1630      .0     8.8     6.1      8      38      11      56       3      30        **
** 8/21/80     1645      .0     8.6     6.4     24      39      34      56      11      30        **
** 8/21/80     1700      .0     9.6     5.7     24      36      38      57      12      30        **
** 8/21/80     1715      .0     8.5     6.6     27      39      38      56      12      30        **
** 8/21/80     1730      .0    10.0     5.0     38      32      62      52      20      28        **
** 8/21/80     1745      .0     9.7     5.8      0      37       0      59       0      32        **
** 8/21/80     1800      .0     7.1     7.8     12      44      15      57       5      30        **
** 8/21/80     1815      .0     6.5     8.2      8      44       9      54       3      29        **
** 8/21/80     1830      .0     8.2     6.7     18      39      25      54       8      29        **
** 8/21/80     1845      .0     8.3     7.1     14      40      19      56       6      30        **
** 8/21/80     1900      .0     7.0     8.0     15      43      19      55       6      30        **
** 8/21/80     1915      .0     7.4     7.9     11      42      14      55       4      30        **
** 8/21/80     1930      .0     9.3     6.5     18      38      27      58       9      31        **
** 8/21/80     1945      .0    11.4     4.6     11      31      20      58       6      31        **
** 8/21/80     2000      .0    10.9     4.6     16      30      28      53       9      29        **
** 8/21/80     2015      .0     8.8     6.6     13      36      19      53       6      28        **
** 8/21/80     2030      .0     8.6     6.6     16      36      23      52       7      28        **
** 8/21/80     2045      .0     8.7     6.5     26      36      38      52      12      28        **
** 8/21/80     2100      .0     9.0     6.2      4      35       6      52       1      28        **
** 8/21/80     2115      .0     8.6     6.6      1      37       1      53       0      29        **
** 8/21/80     2130      .0     8.7     6.5      8      38      11      55       3      30        **
** 8/21/80     2145      .0     7.2     7.8      8      42      10      54       3      29        **
** 8/21/80     2200      .0     8.8     6.6     28      38      41      56      13      30        **
** 8/21/80     2215      .0     7.1     7.9     13      42      16      54       5      29        **
** 8/21/80     2230      .0     8.9     6.6     35      38      52      56      17      30        **
** 8/21/80     2245      .0     7.4     7.8      9      43      11      57       3      30        **
** 8/21/80     2300      .0     9.0     6.5     25      39      37      58      12      31        **
** 0/ 0/ 0        0      .0      .0      .0      0       0       0       0       0       0   *    **
** 0/ 0/ 0        0      .0      .0      .0      0       0       0       0       0       0   *    **
** 0/ 0/ 0        0      .0      .0      .0      0       0       0       0       0       0   *    **
** 0/ 0/ 0        0      .0      .0      .0      0       0       0       0       0       0   *    **
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**                                                                                     **
**                                  15 MIN. DATA                                       **
**                          DRY STACK GAS CONCENTRATION                                **
**                                                                                     **
**                         O2      CO2     CO      NO      CO      NO      CO     NO   ACODE  **
**                  LOAD  VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J   NG/J        **
**   DATE     TIME  MWTH  MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                       **
*****************************************************************************************
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 0/ 0/ 0     0    .0    .0      .0       0       0       0       0       0      0    •   **
** 8/22/80   515    .0   9.7     5.6       6      38       9      60       3     32        **
** 8/22/80   530    .0   6.8     8.0      39      46      49      58      16     31        **
** 8/22/80   545    .0   6.1     8.5      26      49      31      59      10     32        **
** 8/22/80   600    .0   5.2     9.0      31      51      35      58      11     31        **
** 8/22/80   615    .0   6.2     8.4       3      49       3      59       1     32        **
** 8/22/80   630    .0   5.7     8.7      15      49      17      57       5     31        **
** 8/22/80   645    .0   5.0     9.2      10      49      11      55       3     29        **
** 8/22/80   700    .0   5.4     9.0       9      50      10      57       3     31        **
** 8/22/80   715    .0   5.6     8.9      14      50      16      58       5     31        **
** 8/22/80   730    .0   6.3     8.4      18      49      22      60       7     32        **
** 8/22/80   745    .0   5.4     9.0      10      51      11      58       3     31        **
** 8/22/80   800    .0   5.1     9.0      49      45      55      50      18     27        **
** 8/22/80   815    .0   5.6     8.7      15      45      17      52       5     28        **
** 8/22/80   830    .0   5.6     8.6      26      44      30      51      10     27        **
** 8/22/80   845    .0   5.3     8.8      20      44      22      50       7     27        **
** 8/22/80   900    .0   5.4     8.7      10      44      11      50       3     27        **
** 8/22/80   915    .0   5.5     8.7      38      44      44      51      14     27        **
** 8/22/80   930    .0   5.6     8.6      16      44      18      51       6     27        **
** 8/22/80   945    .0   6.1     8.2      57      42      68      50      22     27        **
** 8/22/80  1000    .0   6.2     8.3      53      43      64      52      21     28        **
** 8/22/80  1015    .0   6.3     8.2      49      43      60      52      19     28        **
** 8/22/80  1030    .0   6.2     8.2      44      43      53      52      17     28        **
** 8/22/80  1045    .0   6.2     8.2      56      43      68      52      22     28        **
** 8/22/80  1100    .0   6.2     8.2      39      44      47      53      15     29        **
** 8/22/80  1115    .0   6.4     8.0      36      43      44      53      14     28        **
** 8/22/80  1130    .0   6.5     8.0      23      42      28      52       9     28        **
** 8/22/80  1145    .0   6.6     7.8      24      42      30      52       9     28        **
** 8/22/80  1200    .0   6.5     8.0      24      42      29      52       9     28        **
*****************************************************************************************
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*****************************************************************************************************
**                                        15 MIN, DATA                                             **
**                               DRY STACK GAS CONCENTRATION                                       **
**                                                                                                 **
**                            O2     CO2     CO      NO      CO      NO      CO      NO   ACODE    **
**                    LOAD   VOL%    VOL%   PPMV    PPMV    PPMV    PPMV    NG/J    NG/J           **
**   DATE      TIME   MWTH   MEAS    MEAS   MEAS    MEAS    3%O2    3%O2                           **
*****************************************************************************************************
** 8/22/80     1215    .0     6.5     7.9     26      40      32      49      10      26           **
** 8/22/80     1230    .0     6.6     7.9     27      43      33      53      11      29           **
** 8/22/80     1245    .0     7.7     6.9     25      40      33      54      11      29           **
** 8/22/80     1300    .0     9.0     6.5     36      41      54      61      17      33           **
** 8/22/80     1315    .0     8.1     6.9     21      41      29      57       9      31           **
** 8/22/80     1330    .0     7.2     7.6     22      45      28      58       9      31           **
** 8/22/80     1345    .0     7.9     6.8     25      40      34      55      11      29           **
** 8/22/80     1400    .0     8.9     6.5     70      41     104      61      34      33           **
** 8/22/80     1415    .0     7.1     7.6     18      45      23      58       7      31           **
** 8/22/80     1430    .0     7.2     7.6     22      45      28      58       9      31           **
** 8/22/80     1445    .0     6.6     8.0     20      45      25      56       8      30           **
** 8/22/80     1500    .0     6.6     8.0     20      45      25      56       8      30           **
** 8/22/80     1515    .0     6.6     8.0     20      44      25      55       8      29           **
** 8/22/80     1530    .0     8.1     6.8     28      41      39      57      12      31           **
** 8/22/80     1545    .0     8.6     6.2     34      38      49      55      16      29           **
** 8/22/80     1600    .0     8.3     6.7     29      41      41      58      13      31           **
** 8/22/80     1615    .0     6.9     7.7     23      44      29      56       9      30           **
** 8/22/80     1630    .0     6.8     7.7     23      43      29      54       9      29           **
** 8/22/80     1645    .0     6.8     7.7     21      44      26      55       8      30           **
** 8/22/80     1700    .0     6.9     7.7     21      43      26      54       8      29           **
** 8/22/80     1715    .0    10.4     4.7      7      33      11      56       3      30           **
** 8/22/80     1730    .0     8.6     6.1     35      37      50      53      16      29           **
** 8/22/80     1745    .0    10.1     4.8     43      34      71      56      23      30           **
** 8/22/80     1800    .0    10.0     4.9     54      32      88      52      29      28           **
** 8/22/80     1815    .0     7.7     6.9     31      40      42      54      13      29           **
** 8/22/80     1830    .0     7.8     6.8     25      40      34      54      11      29           **
** 8/22/80     1845    .0     6.0     8.2     19      44      22      52       7      28           **
** 8/22/80     1900    .0     8.0     6.6     36      40      49      55      16      30           **
** 8/22/80     1915    .0     7.8     6.9     12      40      16      54       5      29           **
** 8/22/80     1930    .0     8.3     6.4     42      38      59      53      19      29           **
** 8/22/80     1945    .0     7.3     7.0     23      39      30      51       9      27           **
** 8/22/80     2000    .0     7.1     7.7     35      43      45      55      14      30           **
** 8/22/80     2015    .0     6.4     8.0     17      43      20      53       6      28           **
** 8/22/80     2030    .0     8.6     6.3     32      40      46      58      15      31           **
** 8/22/80     2045    .0     6.6     7.9     15      44      18      55       6      29           **
** 8/22/80     2100    .0     6.8     7.8     18      44      22      55       7      30           **
** 8/22/80     2115    .0     6.6     8.0     17      44      21      55       7      29           **
** 8/22/80     2130    .0     8.1     6.8     35      41      48      57      16      31           **
** 8/22/80     2145    .0     6.9     7.8     16      46      20      58       6      31           **
** 8/22/80     2200    .0     6.8     7.9     16      45      20      57       6      30           **
** 8/22/80     2215    .0     6.8     7.9     17      46      21      58       7      31           **
** 8/22/80     2230    .0     6.6     8.0     18      44      22      55       7      29           **
** 8/22/80     2245    .0     6.8     7.9     17      46      21      58       7      31           **
** 8/22/80     2300    .0     6.9     7.8     16      46      20      58       6      31           **
** 0/ 0/ 0        0    .0      .0      .0      0       0       0       0       0       0    ●      **
** 0/ 0/ 0        0    .0      .0      .0      0       0       0       0       0       0    ●      **
** 0/ 0/ 0        0    .0      .0      .0      0       0       0       0       0       0    ●      **
** 0/ 0/ 0        0    .0      .0      .0      0       0       0       0       0       0    ●      **
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**                                         15 MIN, DATA                                  **
**                                  DRY STACK GAS CONCENTRATION                          **
**                                                                                       **
**                            O2     CO2     CO      NO      CO      NO      CO     NO   ACODE   **
**                     LOAD   VOL%   VOL%    PPMV    PPMV    PPMV    PPMV    NG/J   NG/J         **
**   DATE      TIME    MWTH   MEAS   MEAS    MEAS    MEAS    3%O2    3%O2                        **
*******************************************************************************************
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 0/ 0/ 0        0     .0     .0     .0       0       0       0       0      0      0    *   **
** 8/25/80      845     .0    6.5    8.1      20      44      24      54      8     29        **
** 8/25/80      900     .0    7.8    7.0      42      39      57      53     18     28        **
** 8/25/80      915     .0    6.3    8.2      18      44      22      53      7     29        **
** 8/25/80      930     .0    6.4    8.1      20      43      24      53      8     28        **
** 8/25/80      945     .0    6.4    8.1      17      44      20      54      6     29        **
** 8/25/80     1000     .0    6.6    8.1      20      45      25      56      8     30        **
** 8/25/80     1015     .0    6.3    8.3      17      45      20      55      6     29        **
** 8/25/80     1030     .0    6.4    8.1      20      46      24      56      8     30        **
** 8/25/80     1045     .0    6.3    8.2      20      45      24      55      8     29        **
** 8/25/80     1100     .0    6.3    8.2      20      44      24      53      8     29        **
** 8/25/80     1115     .0    6.2    8.2      17      45      20      54      6     29        **
** 8/25/80     1130     .0    7.9    7.0      24      39      33      53     10     29        **
** 8/25/80     1145     .0    7.6    7.2      28      40      37      53     12     29        **
** 8/25/80     1200     .0    7.9    6.9      25      39      34      53     11     29        **
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**                                                                                                       **
**                                             15 MIN. DATA                                              **
**                                     DRY STACK GAS CONCENTRATION                                       **
**                                                                                                       **
**                             O2      CO2      CO       NO       CO       NO                            **
**                    LOAD    VOL%     VOL%     PPMV     PPMV     PPMV     PPMV     CO       NO   ACODE  **
**   DATE     TIME    MWTH    MEAS     MEAS     MEAS     MEAS     3%O2     3%O2     NG/J     NG/J        **
***********************************************************************************************************
** 8/25/80    1215     .0      8.4      6.4      30       38       42       54       14       29         **
** 8/25/80    1230     .0      8.2      6.6      22       39       31       54       10       29         **
** 8/25/80    1245     .0      7.4      7.3      36       40       47       53       15       28         **
** 8/25/80    1300     .0      7.6      7.2      31       40       41       53       13       29         **
** 8/25/80    1315     .0      6.1      8.2      18       45       21       54        7       29         **
** 8/25/80    1330     .0      7.4      7.2      36       41       47       54       15       29         **
** 8/25/80    1345     .0      6.3      8.1      20       45       24       55        8       29         **
** 8/25/80    1400     .0      6.5      8.0      19       45       23       55        7       30         **
** 8/25/80    1415     .0      7.9      6.9      32       40       44       55       14       29         **
** 8/25/80    1430     .0      7.5      7.3      39       41       52       54       17       29         **
** 8/25/80    1445     .0      7.8      6.9      34       39       46       53       15       28         **
** 8/25/80    1500     .0      8.0      6.8      38       39       52       54       17       29         **
** 8/25/80    1515     .0      7.1      8.2      22       40       28       51        9       28         **
** 8/25/80    1530     .0      9.2      6.0      60       37       91       56       30       30         **
** 8/25/80    1545     .0      6.3      7.9      36       40       44       49       14       26         **
** 8/25/80    1600     .0      8.6      6.2      44       36       64       52       21       28         **
** 8/25/80    1615     .0      7.0      7.5      12       40       15       51        5       27         **
** 8/25/80    1630     .0      7.7      6.8      27       38       36       51       12       27         **
** 8/25/80    1645     .0      9.2      6.1      39       36       59       55       19       29         **
** 8/25/80    1700     .0      6.2      8.1      16       44       19       53        6       29         **
** 8/25/80    1715     .0      9.0      5.8      37       34       55       51       18       27         **
** 8/25/80    1730     .0      9.8      5.3      59       32       95       51       31       27         **
** 8/25/80    1745     .0      7.5      7.1      44       36       58       48       19       26         **
** 8/25/80    1800     .0      9.9      4.9      45       30       73       48       24       26         **
** 8/25/80    1815     .0      9.0      5.9      54       33       81       49       26       26         **
** 8/25/80    1830     .0      7.9      6.7      12       36       16       49        5       26         **
** 8/25/80    1845     .0      8.9      6.0      42       34       62       50       20       27         **
** 8/25/80    1900     .0      9.2      5.6      33       33       50       50       16       27         **
** 8/25/80    1915     .0      7.8      6.7      36       36       49       49       16       26         **
** 8/25/80    1930     .0      7.9      6.7      42       37       57       50       19       27         **
** 8/25/80    1945     .0      7.8      6.8      29       38       39       51       13       28         **
** 8/25/80    2000     .0      7.7      6.8      24       37       32       50       10       27         **
** 8/25/80    2015     .0      7.1      7.3      34       38       44       49       14       26         **
** 8/25/80    2030     .0      7.4      7.2      22       38       29       50        9       27         **
** 8/25/80    2045     .0      7.1      7.2      19       38       24       49        8       26         **
** 8/25/80    2100     .0      7.4      7.6      24       41       31       54       10       29         **
** 8/25/80    2115     .0      6.5      7.9      17       41       21       50        6       27         **
** 8/25/80    2130     .0      6.7      7.8      16       41       20       51        6       28         **
** 8/25/80    2145     .0      6.5      8.0      16       42       19       52        6       28         **
** 8/25/80    2200     .0      6.6      7.9      16       41       20       51        6       27         **
** 8/25/80    2215     .0      6.5      8.0      16       41       19       50        6       27         **
** 8/25/80    2230     .0      7.5      6.9      22       37       29       49        9       26         **
** 8/25/80    2245     .0      6.6      8.1      32       42       40       52       13       28         **
** 8/25/80    2300     .0      6.6      7.9      18       42       22       52        7       28         **
** 0/ 0/ 0       0     .0       .0       .0       0        0        0        0        0        0    *    **
** 0/ 0/ 0       0     .0       .0       .0       0        0        0        0        0        0    *    **
** 0/ 0/ 0       0     .0       .0       .0       0        0        0        0        0        0    *    **
** 0/ 0/ 0       0     .0       .0       .0       0        0        0        0        0        0    *    **
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****************************************************************************************************************
**                                              15 MIN. DATA                                                  **
**                                    DRY STACK GAS CONCENTRATION                                             **
**                                                                                                            **
**                                     O2     CO2     CO      NO      CO      NO      CO      NO    ACODE     **
**                             LOAD   VOL%   VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J             **
**   DATE          TIME        MWTH   MEAS   MEAS    MEAS    MEAS    3%O2    3%O2                             **
****************************************************************************************************************
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 0/ 0/ 0            0         .0     .0     .0       0       0       0       0       0       0      *       **
** 8/26/80          515         .0    8.5    6.5      47      41      67      59      22      32              **
** 8/26/80          530         .0    6.8    8.0      23      47      29      59       9      32              **
** 8/26/80          545         .0    5.2    9.1      16      52      18      59       6      32              **
** 8/26/80          600         .0    4.9    9.2      46      51      51      57      16      30              **
** 8/26/80          615         .0    4.8    9.3      32      52      35      57      11      31              **
** 8/26/80          630         .0    4.7    9.2      31      51      34      56      11      30              **
** 8/26/80          645         .0    4.3    9.5      35      51      37      54      12      29              **
** 8/26/80          700         .0    4.4    9.4      38      52      41      56      13      30              **
** 8/26/80          715         .0    4.8    9.2      23      51      25      56       8      30              **
** 8/26/80          730         .0    5.0    9.1      20      50      22      56       7      30              **
** 8/26/80          745         .0    4.8    9.2      61      50      67      55      22      30              **
** 8/26/80          800         .0    5.2    9.0      22      50      25      57       8      30              **
** 8/26/80          815         .0    5.8    8.6       7      48       8      56       2      30              **
** 8/26/80          830         .0    5.9    8.6      32      48      38      57      12      31              **
** 8/26/80          845         .0    5.7    8.6       2      48       2      56       0      30              **
** 8/26/80          900         .0    6.6    7.9      22      44      27      55       9      29              **
** 8/26/80          915         .0    5.9    8.5      36      46      42      54      14      29              **
** 8/26/80          930         .0    6.1    8.4      17      46      20      55       6      30              **
** 8/26/80          945         .0    5.8    8.6       7      47       8      55       2      30              **
** 8/26/80         1000         .0    5.8    8.5      13      46      15      54       5      29              **
** 8/26/80         1015         .0    5.9    8.5      10      46      11      54       3      29              **
** 8/26/80         1030         .0    5.8    8.5      10      46      11      54       3      29              **
** 8/26/80         1045         .0    5.7    8.6      59      46      69      54      22      29              **
** 8/26/80         1100         .0    5.6    8.6      56      45      65      52      21      28              **
** 8/26/80         1115         .0    5.9    8.5      32      46      38      54      12      29              **
** 8/26/80         1130         .0    6.0    8.4      50      45      60      54      19      29              **
** 8/26/80         1145         .0    6.0    8.3      34      45      40      54      13      29              **
** 8/26/80         1200         .0    7.8    6.8      30      40      40      54      13      29              **
****************************************************************************************************************
```

15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	CO PPMV MEAS	NO PPMV MEAS	CO PPMV 3%O2	NO PPMV 3%O2	CO NG/J	NO NG/J	ACODE
8/26/80	1215	.0	6.2	8.2	36	46	43	56	14	30	
8/26/80	1230	.0	6.2	8.2	22	46	26	56	8	30	
8/26/80	1245	.0	6.0	8.2	21	45	25	54	8	29	
8/26/80	1300	.0	6.5	8.0	40	47	49	58	16	31	
8/26/80	1315	.0	5.0	9.0	37	51	41	57	13	31	
8/26/80	1330	.0	5.0	8.9	12	52	13	58	4	31	
8/26/80	1345	.0	5.0	8.0	14	52	15	58	5	31	
8/26/80	1400	.0	4.6	9.3	30	52	32	57	10	30	
8/26/80	1415	.0	5.0	9.0	37	51	41	57	13	31	
8/26/80	1430	.0	5.0	8.9	12	52	13	58	4	31	
8/26/80	1445	.0	5.0	9.0	14	52	15	58	5	31	
8/26/80	1500	.0	5.1	8.9	32	50	36	56	11	30	
8/26/80	1515	.0	5.5	8.7	19	49	22	56	7	30	
8/26/80	1530	.0	5.7	8.5	24	48	28	56	9	30	
8/26/80	1545	.0	5.9	8.4	19	45	22	53	7	29	
8/26/80	1600	.0	9.7	4.8	16	32	25	51	8	27	
8/26/80	1615	.0	8.2	6.7	52	38	73	53	24	29	
8/26/80	1630	.0	9.9	4.8	3	31	4	50	1	27	
8/26/80	1645	.0	8.5	5.9	25	34	36	49	11	26	
8/26/80	1700	.0	9.5	4.9	23	30	36	47	11	25	
8/26/80	1715	.0	7.2	7.6	24	41	31	53	10	29	
8/26/80	1730	.0	9.6	5.2	12	30	19	47	6	25	
8/26/80	1745	.0	8.1	6.4	25	35	34	48	11	26	
8/26/80	1800	.0	9.8	5.0	2	29	3	46	1	25	
8/26/80	1815	.0	8.1	6.6	14	32	19	44	6	24	
8/26/80	1830	.0	9.5	5.3	11	27	17	42	5	22	
8/26/80	1845	.0	7.9	6.8	15	31	20	42	6	23	
8/26/80	1900	.0	7.9	6.8	37	32	50	44	16	23	
8/26/80	1915	.0	6.6	8.0	17	36	21	45	7	24	
8/26/80	1930	.0	6.6	8.0	16	37	20	46	6	25	
8/26/80	1945	.0	6.9	8.0	13	38	16	48	5	26	
8/26/80	2000	.0	7.1	8.0	16	38	20	49	6	26	
8/26/80	2015	.0	7.2	8.0	16	39	20	50	6	27	
8/26/80	2030	.0	7.4	7.9	15	39	19	51	6	28	
8/26/80	2045	.0	7.3	7.9	16	40	21	52	6	28	
8/26/80	2100	.0	7.2	8.0	16	40	20	52	6	28	
8/26/80	2115	.0	7.1	7.9	17	41	22	53	7	28	
8/26/80	2130	.0	6.9	8.1	20	41	25	52	8	28	
8/26/80	2145	.0	7.2	8.0	20	41	26	53	8	29	
8/26/80	2200	.0	7.0	8.1	19	41	24	52	8	28	
8/26/80	2215	.0	6.9	8.2	17	42	21	53	7	29	
8/26/80	2230	.0	7.0	8.0	16	41	20	52	6	28	
8/26/80	2245	.0	6.8	8.1	17	41	21	52	7	28	
8/26/80	2300	.0	8.3	6.9	36	38	51	53	16	29	
0/ 0/ 0	0	.0	.0	.0	0	0	0	0	0	0	•
0/ 0/ 0	0	.0	.0	.0	0	0	0	0	0	0	•
0/ 0/ 0	0	.0	.0	.0	0	0	0	0	0	0	•
0/ 0/ 0	0	.0	.0	.0	0	0	0	0	0	0	•

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*************************************************************************************************
**                                     15 MIN. DATA                                           **
**                           DRY STACK GAS CONCENTRATION                                      **
**                                                                                            **
**                           O2     CO2     CO      NO      CO      NO      CO     NO  ACODE  **
**                   LOAD   VOL%   VOL%    PPMV    PPMV    PPMV    PPMV    NG/J   NG/J        **
**   DATE     TIME   MWTH   MEAS   MEAS    MEAS    MEAS    3%O2    3%O2                       **
*************************************************************************************************
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 0/ 0/ 0      0     .0     .0     .0      0       0       0       0       0      0   •      **
** 8/27/80    515     .0    8.2    7.5      8      44      11      62       3     33          **
** 8/27/80    530     .0    7.3    7.9      1      44       1      57       0     31          **
** 8/27/80    545     .0    5.6    9.1    169      48     197      56      65     30          **
** 8/27/80    600     .0    5.7    9.0     30      48      35      56      11     30          **
** 8/27/80    615     .0    6.0    8.8     12      47      14      56       4     30          **
** 8/27/80    630     .0    5.6    9.0      4      48       4      56       1     30          **
** 8/27/80    645     .0    5.3    9.2     54      48      61      55      20     29          **
** 8/27/80    700     .0    5.2    9.3     53      49      60      55      19     30          **
** 8/27/80    715     .0    5.6    9.0     35      48      40      56      13     30          **
** 8/27/80    730     .0    5.4    9.0      7      48       8      55       2     30          **
** 8/27/80    745     .0    5.7    9.0     31      48      36      56      12     30          **
** 8/27/80    800     .0    6.6    8.4      7      47       8      58       2     31          **
** 8/27/80    815     .0    6.7    8.4     14      46      17      57       5     31          **
** 8/27/80    830     .0    6.9    8.1     19      45      24      57       8     31          **
** 8/27/80    845     .0    6.4    8.4     50      46      61      56      20     30          **
** 8/27/80    900     .0    6.2    8.3     40      46      48      56      16     30          **
** 8/27/80    915     .0    6.5    8.1     39      45      48      55      16     30          **
** 8/27/80    930     .0    6.5    8.0     34      44      42      54      13     29          **
** 8/27/80    945     .0    6.5    8.1     34      44      42      54      13     29          **
** 8/27/80   1000     .0    6.5    8.0     35      45      43      55      14     30          **
** 8/27/80   1015     .0    6.4    8.1     36      45      44      55      14     30          **
** 8/27/80   1030     .0    7.1    7.6     40      45      51      58      17     31          **
** 8/27/80   1045     .0    6.5    8.1     39      46      48      57      16     31          **
** 8/27/80   1100     .0    6.7    7.8     37      46      46      57      15     31          **
** 8/27/80   1115     .0    6.3    8.2     45      47      55      57      18     31          **
** 8/27/80   1130     .0    8.2    6.5     65      41      91      57      30     31          **
** 8/27/80   1145     .0    6.5    8.0     35      46      43      57      14     31          **
** 8/27/80   1200     .0    8.2    6.3     77      40     108      56      35     30          **
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*****************************************************************************************************
**                                                                                                 **
**                                        15 MIN. DATA                                             **
**                              DRY STACK GAS CONCENTRATION                                        **
**                                                                                                 **
**                               O2     CO2     CO      NO      CO      NO      CO      NO  ACODE  **
**                       LOAD   VOL%    VOL%   PPMV    PPMV    PPMV    PPMV    NG/J    NG/J        **
**   DATE        TIME    MWTH   MEAS    MEAS   MEAS    MEAS    3%O2    3%O2                        **
*****************************************************************************************************
** 8/27/80       1215     .0     7.8     6.7     18      41      24      56       8      30        **
** 8/27/80       1230     .0     6.5     7.9     48      45      59      55      19      30        **
** 8/27/80       1245     .0     6.6     8.0     37      46      46      57      15      31        **
** 8/27/80       1300     .0     9.8     5.0     66      36     106      58      35      31        **
** 8/27/80       1315     .0     8.3     6.3      6      40       8      56       2      30        **
** 8/27/80       1330     .0     9.7     4.9     27      35      43      55      14      30        **
** 8/27/80       1345     .0     5.9     8.5     26      47      31      56      10      30        **
** 8/27/80       1400     .0     7.6     6.8     43      40      57      53      19      29        **
** 8/27/80       1415     .0     6.7     7.9     22      46      27      57       9      31        **
** 8/27/80       1430     .0     7.4     7.3     37      45      49      59      16      32        **
** 8/27/80       1445     .0     8.4     6.3     24      39      34      55      11      30        **
** 8/27/80       1500     .0     8.4     6.2     53      38      75      54      25      29        **
** 8/27/80       1515     .0     7.0     7.2     38      40      48      51      16      27        **
** 8/27/80       1530     .0     7.9     7.0      1      42       1      57       0      31        **
** 8/27/80       1545     .0     9.3     5.2     69      34     106      52      35      28        **
** 8/27/80       1600     .0     9.8     4.7     26      32      41      51      13      27        **
** 8/27/80       1615     .0     8.9     6.0      4      36       5      53       1      29        **
** 8/27/80       1630     .0     9.8     4.8     51      32      82      51      27      27        **
** 8/27/80       1645     .0     9.2     5.4     62      33      94      50      31      27        **
** 8/27/80       1700     .0     9.5     5.2      4      35       6      54       2      29        **
** 8/27/80       1715     .0     8.7     5.9      6      38       8      55       2      30        **
** 8/27/80       1730     .0     9.1     5.1      8      33      12      50       4      27        **
** 8/27/80       1745     .0     8.4     6.6     67      39      95      55      31      30        **
** 8/27/80       1800     .0     9.0     5.0     53      32      79      48      26      26        **
** 8/27/80       1815     .0     9.3     5.6     39      36      60      55      19      30        **
** 8/27/80       1830     .0     9.1     4.7     70      31     106      47      35      25        **
** 8/27/80       1845     .0     9.3     4.8     24      31      37      47      12      25        **
** 8/27/80       1900     .0     9.0     5.6     22      34      33      51      10      27        **
** 8/27/80       1915     .0    10.1     4.0     24      28      39      46      13      25        **
** 8/27/80       1930     .0     8.7     6.2     16      37      23      54       7      29        **
** 8/27/80       1945     .0     9.4     5.1     56      31      87      48      28      26        **
** 8/27/80       2000     .0     9.6     4.8     70      32     110      50      36      27        **
** 8/27/80       2015     .0     7.0     7.6     30      41      38      52      12      28        **
** 8/27/80       2030     .0     8.0     6.4     15      36      20      49       6      27        **
** 8/27/80       2045     .0     9.0     5.5     28      32      42      48      13      26        **
** 8/27/80       2100     .0     7.9     6.4     22      36      30      49      10      26        **
** 8/27/80       2115     .0     7.8     6.6     24      38      32      51      10      28        **
** 8/27/80       2130     .0     9.2     5.3     67      33     102      50      33      27        **
** 8/27/80       2145     .0     7.3     6.9      4      38       5      50       1      27        **
** 8/27/80       2200     .0     7.8     6.5     15      37      20      50       6      27        **
** 8/27/80       2215     .0     7.3     7.0     31      38      40      50      13      27        **
** 8/27/80       2230     .0     8.7     5.7     69      34     101      49      33      27        **
** 8/27/80       2245     .0     7.6     6.7     58      38      78      51      25      27        **
** 8/27/80       2300     .0     7.5     6.7     48      38      64      50      21      27        **
** 0/ 0/ 0          0     .0      .0      .0      0       0       0       0       0       0   *    **
** 0/ 0/ 0          0     .0      .0      .0      0       0       0       0       0       0   *    **
** 0/ 0/ 0          0     .0      .0      .0      0       0       0       0       0       0   *    **
** 0/ 0/ 0          0     .0      .0      .0      0       0       0       0       0       0   *    **
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**                                                                                      **
**                                   15 MIN. DATA                                       **
**                           DRY STACK GAS CONCENTRATION                                **
**                                                                                      **
**                            O2      CO2     CO      NO      CO      NO                **
**                    LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV   CO    NO   ACODE **
**   DATE      TIME   MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2  NG/J  NG/J      **
******************************************************************************************
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 0/ 0/ 0       0     .0      .0      .0      0       0       0       0     0     0   *    **
** 8/28/80     515     .0     5.4     8.8     31      48      35      55    11    30        **
** 8/28/80     530     .0     5.4     8.7     52      48      60      55    19    30        **
** 8/28/80     545     .0     5.1     8.9    270      49     305      55   101    30        **
** 8/28/80     600     .0     3.8     9.6    450      51     471      53   155    28        **
** 8/28/80     615     .0     4.1     9.4    372      51     396      54   130    29        **
** 8/28/80     630     .0     4.4     9.2    311      51     337      55   111    30        **
** 8/28/80     645     .0     3.7     9.6    425      52     442      54   146    29        **
** 8/28/80     700     .0     3.4     9.8    459      53     469      54   155    29        **
** 8/28/80     715     .0     3.9     9.5    371      53     390      55   128    30        **
** 8/28/80     730     .0     4.5     9.2    275      52     300      56    99    30        **
** 8/28/80     745     .0     4.7     9.2    296      52     327      57   107    31        **
** 8/28/80     800     .0     5.1     8.8    184      51     208      57    68    31        **
** 8/28/80     815     .0     5.0     8.9    218      50     245      56    81    30        **
** 8/28/80     830     .0     5.7     8.5    161      49     189      57    62    31        **
** 8/28/80     845     .0    -1.0    -1.0     -1      -1       0       0     0     0   C    **
** 8/28/80     900     .0     5.6     8.6     16      48      18      56     6    30        **
** 8/28/80     915     .0     6.1     8.5     63      47      76      56    25    30        **
** 8/28/80     930     .0     6.3     8.3     50      47      61      57    20    31        **
** 8/28/80     945     .0     6.4     8.2     45      47      55      58    18    31        **
** 8/28/80    1000     .0     6.5     8.1     16      46      19      57     6    31        **
** 8/28/80    1015     .0     6.7     8.1     38      48      47      60    15    32        **
** 8/28/80    1030     .0     6.4     8.2     26      48      32      59    10    32        **
** 8/28/80    1045     .0     6.3     8.3     48      48      58      58    19    31        **
** 8/28/80    1100     .0     6.3     8.3     23      48      28      58     9    31        **
** 8/28/80    1115     .0     5.2     9.0      3      50       3      57     1    30        **
** 8/28/80    1130     .0     4.8     9.2     23      49      25      54     8    29        **
** 8/28/80    1145     .0     5.0     9.1     28      50      31      56    10    30        **
** 8/28/80    1200     .0     5.1     9.0      2      49       2      55     0    30        **
******************************************************************************************
```

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*************************************************************************************************
**                                      15 MIN. DATA                                           **
**                              DRY STACK GAS CONCENTRATION                                    **
**                                                                                             **
**                            O2      CO2     CO      NO      CO      NO      CO      NO  ACODE **
**                    LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J      **
**   DATE     TIME    MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                      **
*************************************************************************************************
** 8/28/80    1215    .0      5.0     9.1     13      50      14      56      4       30        **
** 8/28/80    1230    .0      5.0     9.1     19      50      21      56      7       30        **
** 8/28/80    1245    .0      5.1     9.0     18      50      20      56      6       30        **
** 8/28/80    1300    .0      5.0     9.1     11      49      12      55      4       29        **
** 8/28/80    1315    .0      5.5     8.8     15      50      17      58      5       31        **
** 8/28/80    1330    .0     -1.0    -1.0     -1      -1       0       0      0        0   C    **
** 8/28/80    1345    .0      4.9     9.2      8      53       8      59      2       32        **
** 8/28/80    1400    .0      4.7     9.2     15      53      16      58      5       31        **
** 8/28/80    1415    .0      5.3     9.0     11      54      12      61      4       33        **
** 8/28/80    1430    .0      5.5     8.8      9      52      10      60      3       32        **
** 8/28/80    1445    .0      4.8     9.2     15      53      16      58      5       31        **
** 8/28/80    1500    .0      5.9     8.6     23      51      27      60      9       33        **
** 8/28/80    1515    .0      5.6     8.8     20      52      23      60      7       33        **
** 8/28/80    1530    .0      5.5     8.9     14      49      16      56      5       30        **
** 8/28/80    1545    .0      5.4     8.9     15      50      17      57      5       31        **
** 8/28/80    1600    .0      5.6     8.8     36      50      42      58     13       31        **
** 8/28/80    1615    .0      5.5     8.9     21      50      24      58      8       31        **
** 8/28/80    1630    .0      5.9     8.6     25      49      29      58      9       31        **
** 8/28/80    1645    .0      5.6     8.9     37      50      43      58     14       31        **
** 8/28/80    1700    .0      5.8     8.6     25      50      29      59      9       32        **
** 8/28/80    1715    .0      5.7     8.9      9      50      10      58      3       31        **
** 8/28/80    1730    .0      5.8     8.7     31      50      36      59     12       32        **
** 8/28/80    1745    .0      5.8     8.8     18      51      21      60      7       32        **
** 8/28/80    1800    .0      5.5     8.8     19      49      22      56      7       30        **
** 8/28/80    1815    .0      5.7     8.7     23      49      27      57      8       31        **
** 8/28/80    1830    .0      5.8     8.7      7      50       8      59      2       32        **
** 8/28/80    1845    .0      6.0     8.6     26      48      31      57     10       31        **
** 8/28/80    1900    .0      6.1     8.6      9      49      10      59      3       32        **
** 8/28/80    1915    .0      6.3     8.5      3      49       3      60      1       32        **
** 8/28/80    1930    .0      6.2     8.5     32      46      38      56     12       30        **
** 8/28/80    1945    .0      6.6     8.2     30      46      37      57     12       31        **
** 8/28/80    2000    .0      6.4     8.3     32      47      39      58     13       31        **
** 8/28/80    2015    .0      6.5     8.3     28      46      34      57     11       31        **
** 8/28/80    2030    .0      6.6     8.3     42      46      52      57     17       31        **
** 8/28/80    2045    .0      6.3     8.4     25      47      30      57     10       31        **
** 8/28/80    2100    .0      6.4     8.3     18      47      22      58      7       31        **
** 8/28/80    2115    .0      6.5     8.3     35      48      43      59     14       32        **
** 8/28/80    2130    .0      6.7     8.2     14      48      17      60      5       32        **
** 8/28/80    2145    .0      6.6     8.2     15      48      18      60      6       32        **
** 8/28/80    2200    .0      6.6     8.2     23      48      28      60      9       32        **
** 8/28/80    2215    .0      6.4     8.4     22      48      27      59      8       32        **
** 8/28/80    2230    .0      5.9     8.7     23      50      27      59      9       32        **
** 8/28/80    2245    .0      6.2     8.6     41      50      49      60     16       33        **
** 8/28/80    2300    .0      5.9     8.7     31      50      36      59     12       32        **
** 0/ 0/ 0       0    .0       .0      .0      0       0       0       0      0        0   *    **
** 0/ 0/ 0       0    .0       .0      .0      0       0       0       0      0        0   *    **
** 0/ 0/ 0       0    .0       .0      .0      0       0       0       0      0        0   *    **
** 0/ 0/ 0       0    .0       .0      .0      0       0       0       0      0        0   *    **
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**                                                                                    **
**                                   15 MIN. DATA                                     **
**                          DRY STACK GAS CONCENTRATION                               **
**                                                                                    **
**                         O2    CO2     CO     NO     CO     NO                     **
** DATE      TIME  LOAD   VOL%   VOL%   PPMV   PPMV   PPMV   PPMV    CO    NO ACUDE **
**                 MWTH   MEAS   MEAS   MEAS   MEAS   3%O2   3%O2  NG/J  NG/J       **
****************************************************************************************
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 0/ 0/ 0      0    .0     .0     .0      0      0      0      0     0     0   ●   **
** 8/29/80    515    .0   10.0    5.7     44     39     72     64    23    34       **
** 8/29/80    530    .0   10.4    5.1     29     36     49     61    16    33       **
** 8/29/80    545    .0    9.1    6.1     59     41     89     62    29    33       **
** 8/29/80    600    .0    7.1    8.0      1     50      1     64     0    35       **
** 8/29/80    615    .0    7.0    8.0     17     50     21     64     7    34       **
** 8/29/80    630    .0    9.3    6.0      1     41      1     63     0    34       **
** 8/29/80    645    .0    6.9    8.0     17     47     21     60     7    32       **
** 8/29/80    700    .0    8.6    6.7     30     43     43     62    14    33       **
** 8/29/80    715    .0    6.8    8.1     11     48     13     60     4    33       **
** 8/29/80    730    .0   10.8    4.5      6     35     10     62     3    33       **
** 8/29/80    745    .0    6.4    8.6      9     51     11     62     3    34       **
** 8/29/80    800    .0    5.9    8.8     32     52     38     62    12    33       **
** 8/29/80    815    .0    5.7    8.8     20     52     23     61     7    33       **
** 8/29/80    830    .0    6.1    8.7     13     53     15     64     5    34       **
** 8/29/80    845    .0    6.1    8.7     13     53     15     64     5    34       **
** 8/29/80    900    .0    5.8    8.8      0     53      0     62     0    34       **
** 8/29/80    915    .0    4.9    9.2      0     52      0     58     0    31       **
** 8/29/80    930    .0    4.8    9.2     39     52     43     57    14    31       **
** 8/29/80    945    .0    4.7    9.2     33     52     36     57    12    31       **
** 8/29/80   1000    .0    5.0    9.1     47     52     52     58    17    31       **
** 8/29/80   1015    .0    5.1    9.1      0     51      0     57     0    31       **
** 8/29/80   1030    .0    4.9    9.1      9     51     10     57     3    30       **
** 8/29/80   1045    .0    4.8    9.2      0     50      0     55     0    30       **
** 8/29/80   1100    .0    5.1    9.1     10     50     11     56     3    30       **
** 8/29/80   1115    .0    4.9    9.1     14     51     15     57     5    30       **
** 8/29/80   1130    .0    4.9    9.1     10     50     11     55     3    30       **
** 8/29/80   1145    .0    4.9    9.2      0     51      0     57     0    30       **
** 8/29/80   1200    .0    5.2    9.0      0     52      0     59     0    32       **
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**                                                                                                 **
**                                        15 MIN. DATA                                             **
**                                 DRY STACK GAS CONCENTRATION                                     **
**                                                                                                 **
**                           O2      CO2      CO      NO      CO      NO                           **
**                   LOAD    VOL%    VOL%     PPMV    PPMV    PPMV    PPMV    CO     NO    ACODE   **
**   DATE     TIME   MWTH    MEAS    MEAS     MEAS    MEAS    3%O2    3%O2    NG/J   NG/J          **
*****************************************************************************************************
** 8/29/80    1215    .0     4.8     9.2      42      52      46      57      15     31            **
** 8/29/80    1230    .0     5.3     8.9      25      51      28      58       9     31            **
** 8/29/80    1245    .0     5.1     9.1      10      52      11      58       3     31            **
** 8/29/80    1300    .0     5.3     9.0      33      51      37      58      12     31            **
** 8/29/80    1315    .0     4.7     9.3      43      54      47      59      15     32            **
** 8/29/80    1330    .0     4.8     9.2      15      54      16      60       5     32            **
** 8/29/80    1345    .0     4.6     9.3      16      56      17      61       5     33            **
** 8/29/80    1400    .0     5.4     8.8      20      53      23      61       7     33            **
** 8/29/80    1415    .0     5.3     8.9       6      54       6      61       2     33            **
** 8/29/80    1430    .0     5.3     8.9       8      53       9      60       3     32            **
** 8/29/80    1445    .0     5.1     9.0      16      53      18      60       5     32            **
** 8/29/80    1500    .0     5.2     8.9      11      52      12      59       4     32            **
** 8/29/80    1515    .0     5.3     8.9      15      52      17      59       5     32            **
** 8/29/80    1530    .0     5.1     9.0      46      50      52      56      17     30            **
** 8/29/80    1545    .0     5.0     9.2      31      52      34      58      11     31            **
** 8/29/80    1600    .0     4.7     9.2      22      52      24      57       8     31            **
** 8/29/80    1615    .0     4.6     9.3      38      53      41      58      13     31            **
** 8/29/80    1630    .0     5.3     8.9       2      51       2      58       0     31            **
** 8/29/80    1645    .0     4.8     9.2      28      52      31      57      10     31            **
** 8/29/80    1700    .0     5.3     8.9       0      51       0      58       0     31            **
** 8/29/80    1715    .0     5.3     8.9      25      51      28      58       9     31            **
** 8/29/80    1730    .0     5.2     8.9      14      50      15      57       5     30            **
** 8/29/80    1745    .0     4.9     9.1       7      50       7      55       2     30            **
** 8/29/80    1800    .0     5.1     9.0      73      51      82      57      27     31            **
** 8/29/80    1815    .0     5.0     9.1      47      51      52      57      17     31            **
** 8/29/80    1830    .0     4.9     9.1      16      50      17      55       5     30            **
** 8/29/80    1845    .0     4.7     9.2       0      51       0      56       0     30            **
** 8/29/80    1900    .0     5.0     9.1       2      51       2      57       0     31            **
** 8/29/80    1915    .0     5.0     9.1       7      51       7      57       2     31            **
** 8/29/80    1930    .0     5.1     9.0      24      51      27      57       8     31            **
** 8/29/80    1945    .0     5.0     9.1      25      51      28      57       9     31            **
** 8/29/80    2000    .0     5.1     9.0      23      51      26      57       8     31            **
** 8/29/80    2015    .0     5.2     9.0      29      51      33      58      10     31            **
** 8/29/80    2030    .0     5.2     9.0      39      50      44      57      14     30            **
** 8/29/80    2045    .0     5.4     8.9       0      50       0      57       0     31            **
** 8/29/80    2100    .0     5.2     9.0       5      50       5      57       1     30            **
** 8/29/80    2115    .0     5.0     9.2      27      51      30      57      10     31            **
** 8/29/80    2130    .0     4.7     9.2       3      52       3      57       1     31            **
** 8/29/80    2145    .0     5.2     9.1      19      50      21      57       7     30            **
** 8/29/80    2200    .0     5.1     9.0       8      50       9      56       2     30            **
** 8/29/80    2215    .0     5.0     9.2      21      50      23      56       7     30            **
** 8/29/80    2230    .0     5.0     9.1      16      50      18      56       5     30            **
** 8/29/80    2245    .0     4.6     9.3       0      52       0      57       0     30            **
** 8/29/80    2300    .0     4.8     9.3       0      51       0      56       0     30            **
** 0/ 0/ 0       0    .0      .0      .0       0       0       0       0       0      0    *       **
** 0/ 0/ 0       0    .0      .0      .0       0       0       0       0       0      0    *       **
** 0/ 0/ 0       0    .0      .0      .0       0       0       0       0       0      0    *       **
** 0/ 0/ 0       0    .0      .0      .0       0       0       0       0       0      0    *       **
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**                                                                                                  **
**                                        15 MIN. DATA                                              **
**                               DRY STACK GAS CONCENTRATION                                        **
**                                                                                                  **
**                                 O2      CO2      CO       NO      CO      NO                     **
**                         LOAD   VOL%     VOL%    PPMV     PPMV    PPMV    PPMV    CO     NO  ACODE**
**   DATE        TIME      MWTH   MEAS     MEAS    MEAS     MEAS    3%O2    3%O2   NG/J   NG/J      **
******************************************************************************************************
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 0/ 0/ 0          0       .0     .0       .0       0        0       0       0      0      0    *   **
** 9/ 2/80        515       .0   13.6      2.1      22       26      53      63     17     34        **
** 9/ 2/80        530       .0   14.2      1.7      19       24      50      64     16     34        **
** 9/ 2/80        545       .0   10.8      5.3      10       38      17      67      5     36        **
** 9/ 2/80        600       .0    8.5      6.8       0       44       0      63      0     34        **
** 9/ 2/80        615       .0    7.2      7.8      14       48      18      62      6     34        **
** 9/ 2/80        630       .0    6.9      8.1      10       50      12      63      4     34        **
** 9/ 2/80        645       .0    6.6      8.3       0       50       0      62      0     33        **
** 9/ 2/80        700       .0    7.0      8.0      30       50      38      64     12     34        **
** 9/ 2/80        715       .0    6.9      8.0      18       49      23      62      7     33        **
** 9/ 2/80        730       .0    8.2      6.7      19       43      26      60      8     32        **
** 9/ 2/80        745       .0    7.3      7.9       1       49       1      64      0     34        **
** 9/ 2/80        800       .0    7.2      7.8      15       49      19      64      6     34        **
** 9/ 2/80        815       .0    6.9      8.0       0       50       0      63      0     34        **
** 9/ 2/80        830       .0    6.9      8.1      17       50      21      63      7     34        **
** 9/ 2/80        845       .0    7.0      8.0      32       51      41      65     13     35        **
** 9/ 2/80        900       .0    7.0      7.9      18       50      23      64      7     34        **
** 9/ 2/80        915       .0    8.7      6.5      38       45      55      66     18     35        **
** 9/ 2/80        930       .0    9.6      5.8      16       42      25      66      8     36        **
** 9/ 2/80        945       .0    7.3      7.6      23       50      30      65      9     35        **
** 9/ 2/80       1000       .0    7.4      7.6      42       46      55      60     18     33        **
** 9/ 2/80       1015       .0    7.5      7.5      50       42      66      56     22     30        **
** 9/ 2/80       1030       .0    7.2      7.6      45       42      58      54     19     29        **
** 9/ 2/80       1045       .0    8.9      6.3      62       38      92      56     30     30        **
** 9/ 2/80       1100       .0    7.4      7.5      42       43      55      57     18     30        **
** 9/ 2/80       1115       .0    6.8      7.9      42       42      53      53     17     28        **
** 9/ 2/80       1130       .0    7.1      7.7      42       42      54      54     17     29        **
** 9/ 2/80       1145       .0    8.5      6.6      61       39      88      56     29     30        **
** 9/ 2/80       1200       .0    9.1      6.0      57       37      86      56     28     30        **
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**                                                                                                 **
**                                       15 MIN. DATA                                              **
**                              DRY STACK GAS CONCENTRATION                                        **
**                                                                                                 **
**                              O2      CO2     CO      NO      CO      NO                         **
**                       LOAD   VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    CO      NO   ACODE **
**    DATE      TIME     MWTH   MEAS    MEAS    MEAS    MEAS    3%O2    3%O2    NG/J    NG/J       **
*****************************************************************************************************
** 9/ 2/80      1215      .0     8.6     6.4     50      40      72      58      24      31        **
** 9/ 2/80      1230      .0     9.4     5.6     73      36     113      56      37      30        **
** 9/ 2/80      1245      .0     8.6     6.3     68      40      98      58      32      31        **
** 9/ 2/80      1300      .0    11.0     4.0     91      33     164      59      54      32        **
** 9/ 2/80      1315      .0    10.0     4.8     65      35     106      57      35      31        **
** 9/ 2/80      1330      .0    10.2     5.1    115      38     192      63      63      34        **
** 9/ 2/80      1345      .0    10.6     4.6     85      35     147      60      48      32        **
** 9/ 2/80      1400      .0    11.3     3.7     71      32     132      59      43      32        **
** 9/ 2/80      1415      .0     9.6     5.8    100      38     158      60      52      32        **
** 9/ 2/80      1430      .0    10.6     4.7     78      33     135      57      44      31        **
** 9/ 2/80      1445      .0    10.4     4.5     68      32     115      54      38      29        **
** 9/ 2/80      1500      .0     9.0     6.4     78      38     117      57      38      31        **
** 9/ 2/80      1515      .0     8.0     6.6     47      38      65      52      21      28        **
** 9/ 2/80      1530      .0     9.9     5.3     87      35     141      56      46      30        **
** 9/ 2/80      1545      .0     9.4     5.8     93      36     144      56      47      30        **
** 9/ 2/80      1600      .0     9.1     6.1     55      38      83      57      27      31        **
** 9/ 2/80      1615      .0    10.4     4.8     84      33     143      56      47      30        **
** 9/ 2/80      1630      .0    12.7     2.6    112      25     244      54      80      29        **
** 9/ 2/80      1645      .0    11.2     3.6     59      27     108      49      35      27        **
** 9/ 2/80      1700      .0    12.0     3.8    101      29     203      58      67      31        **
** 9/ 2/80      1715      .0    13.0     2.3     83      22     188      49      62      27        **
** 9/ 2/80      1730      .0    11.7     4.0     82      29     159      56      52      30        **
** 9/ 2/80      1745      .0    12.0     3.4    103      26     207      52      68      28        **
** 9/ 2/80      1800      .0    12.4     3.0     61      25     128      52      42      28        **
** 9/ 2/80      1815      .0    11.3     4.7     76      31     141      57      46      31        **
** 9/ 2/80      1830      .0    11.9     3.6     95      28     188      55      62      30        **
** 9/ 2/80      1845      .0    11.1     4.4     62      30     113      54      37      29        **
** 9/ 2/80      1900      .0    11.0     4.2     80      29     144      52      47      28        **
** 9/ 2/80      1915      .0     9.8     5.4     85      34     137      54      45      29        **
** 9/ 2/80      1930      .0    11.2     4.2     84      25     155      46      51      25        **
** 9/ 2/80      1945      .0    10.6     4.4     54      30      93      52      30      28        **
** 9/ 2/80      2000      .0    10.8     5.0     68      33     120      58      39      31        **
** 9/ 2/80      2015      .0    10.5     4.8    105      31     180      53      59      28        **
** 9/ 2/80      2030      .0    10.8     4.4     69      30     122      53      40      28        **
** 9/ 2/80      2045      .0     9.9     5.1     84      32     136      52      45      28        **
** 9/ 2/80      2100      .0    10.1     5.5     99      35     164      58      54      31        **
** 9/ 2/80      2115      .0    10.4     4.9     82      33     139      56      46      30        **
** 9/ 2/80      2130      .0     8.9     6.3     52      37      77      55      25      29        **
** 9/ 2/80      2145      .0    10.0     5.3     67      35     110      57      36      31        **
** 9/ 2/80      2200      .0     9.0     6.1     51      38      76      57      25      31        **
** 9/ 2/80      2215      .0     8.9     6.2     54      38      80      56      26      30        **
** 9/ 2/80      2230      .0     9.2     5.9     50      37      76      56      25      30        **
** 9/ 2/80      2245      .0     8.9     6.2     60      38      89      56      29      30        **
** 9/ 2/80      2300      .0    10.2     5.0     75      33     125      55      41      29        **
** 0/ 0/ 0         0      .0      .0      .0      0       0       0       0       0       0    *   **
** 0/ 0/ 0         0      .0      .0      .0      0       0       0       0       0       0    *   **
** 0/ 0/ 0         0      .0      .0      .0      0       0       0       0       0       0    *   **
** 0/ 0/ 0         0      .0      .0      .0      0       0       0       0       0       0    *   **
*****************************************************************************************************
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*****************************************************************************************************************
**                                         15 MIN. DATA                                                        **
**                                DRY STACK GAS CONCENTRATION                                                  **
**                                                                                                             **
**                             O2      CO2      CO      NO      CO      NO      CO      NO    ACODE            **
**                     LOAD   VOL%    VOL%     PPMV    PPMV    PPMV    PPMV    NG/J    NG/J                    **
**    DATE     TIME    MWTH   MEAS    MEAS     MEAS    MEAS    3%O2    3%O2                                    **
*****************************************************************************************************************
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 0/ 0/ 0       0      .0     .0      .0        0       0       0       0       0       0     *               **
** 9/ 3/80     515      .0    6.6     8.2      158      46     197      57      65      31                     **
** 9/ 3/80     530      .0    6.8     8.1      149      46     189      58      62      31                     **
** 9/ 3/80     545      .0    4.5     9.4      613      51     669      55     220      30                     **
** 9/ 3/80     600      .0    5.2     9.0      426      48     485      54     160      29                     **
** 9/ 3/80     615      .0    4.9     9.2      578      49     646      54     213      29                     **
** 9/ 3/80     630      .0    5.1     9.1      508      49     575      55     190      30                     **
** 9/ 3/80     645      .0    4.5     9.4      590      50     643      54     212      29                     **
** 9/ 3/80     700      .0    4.8     9.2      519      50     577      55     190      30                     **
** 9/ 3/80     715      .0    4.6     9.4      561      50     616      54     203      29                     **
** 9/ 3/80     730      .0    4.9     9.2      425      50     475      55     157      30                     **
** 9/ 3/80     745      .0    5.3     9.0      410      50     470      57     155      31                     **
** 9/ 3/80     800      .0    6.2     8.5      275      48     334      58     110      31                     **
** 9/ 3/80     815      .0    6.2     8.5      273      48     332      58     109      31                     **
** 9/ 3/80     830      .0    6.6     8.2      201      46     251      57      83      31                     **
** 9/ 3/80     845      .0    6.8     8.1        0      46       0      58       0      31                     **
** 9/ 3/80     900      .0    6.4     8.3       12      46      14      56       4      30                     **
** 9/ 3/80     915      .0    6.2     8.2        7      45       8      54       2      29                     **
** 9/ 3/80     930      .0    6.2     8.2       18      45      21      54       7      29                     **
** 9/ 3/80     945      .0    6.2     8.2       18      44      21      53       7      29                     **
** 9/ 3/80    1000      .0    6.4     8.1       52      44      64      54      21      29                     **
** 9/ 3/80    1015      .0    6.5     8.0       32      44      39      54      13      29                     **
** 9/ 3/80    1030      .0    6.9     7.7       23      43      29      54       9      29                     **
** 9/ 3/80    1045      .0    6.3     8.1       23      44      28      53       9      29                     **
** 9/ 3/80    1100      .0    6.5     8.0       19      44      23      54       7      29                     **
** 9/ 3/80    1115      .0    6.4     8.0       17      43      20      53       6      28                     **
** 9/ 3/80    1130      .0    6.5     7.9       18      43      22      53       7      28                     **
** 9/ 3/80    1145      .0    8.0     6.7       18      39      24      54       8      29                     **
** 9/ 3/80    1200      .0    7.9     6.7       20      39      27      53       9      29                     **
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**                                            15 MIN. DATA                                        **
**                                   DRY STACK GAS CONCENTRATION                                  **
**                                                                                                **
**                               O2     CO2      CO      NO      CU      NO      CO      NO ACODE **
**                     LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J       **
**   DATE       TIME   MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                       **
****************************************************************************************************
** 9/ 3/80      1215     .0     6.1     8.2      25      45      30      54       9      29       **
** 9/ 3/80      1230     .0     7.9     6.7      32      39      44      53      14      29       **
** 9/ 3/80      1245     .0     6.6     7.8      17      43      21      53       7      29       **
** 9/ 3/80      1300     .0     6.3     8.0       2      44       2      53       0      29       **
** 9/ 3/80      1315     .0     6.2     8.2       0      44       0      53       0      29       **
** 9/ 3/80      1330     .0     6.1     8.2      35      44      42      53      13      28       **
** 9/ 3/80      1345     .0     5.9     8.4      12      44      14      52       4      28       **
** 9/ 3/80      1400     .0     6.1     8.2      13      44      15      53       5      28       **
** 9/ 3/80      1415     .0     6.1     8.2      10      43      12      52       3      28       **
** 9/ 3/80      1430     .0     5.9     8.3      30      42      35      50      11      27       **
** 9/ 3/80      1445     .0     7.8     6.8       6      38       8      51       2      28       **
** 9/ 3/80      1500     .0     7.6     6.8      17      37      22      49       7      27       **
** 9/ 3/80      1515     .0     6.0     8.2      24      41      28      49       9      26       **
** 9/ 3/80      1530     .0     7.9     6.5      18      36      24      49       8      26       **
** 9/ 3/80      1545     .0     7.7     7.2      66      38      89      51      29      27       **
** 9/ 3/80      1600     .0     5.9     8.3       5      41       5      48       1      26       **
** 9/ 3/80      1615     .0     5.9     8.2      24      42      28      50       9      27       **
** 9/ 3/80      1630     .0     6.4     7.9      20      40      24      49       8      26       **
** 9/ 3/80      1645     .0     6.5     7.9      15      38      18      47       6      25       **
** 9/ 3/80      1700     .0     8.7     5.7      23      32      33      46      11      25       **
** 9/ 3/80      1715     .0     8.8     6.0       0      32       0      47       0      25       **
** 9/ 3/80      1730     .0     9.3     5.0      27      27      41      41      13      22       **
** 9/ 3/80      1745     .0     9.8     5.1      21      27      33      43      11      23       **
** 9/ 3/80      1800     .0    12.0     2.8       0      20       0      40       0      21       **
** 9/ 3/80      1815     .0     9.8     4.9      16      25      25      40       8      21       **
** 9/ 3/80      1830     .0    11.8     2.7      36      19      70      37      23      20       **
** 9/ 3/80      1845     .0     9.4     5.4      26      25      40      38      13      21       **
** 9/ 3/80      1900     .0    11.4     3.7      15      23      28      43       9      23       **
** 9/ 3/80      1915     .0     9.6     4.9      20      25      31      39      10      21       **
** 9/ 3/80      1930     .0    12.7     2.3      20      18      43      39      14      21       **
** 9/ 3/80      1945     .0    11.1     4.0      35      23      63      42      21      22       **
** 9/ 3/80      2000     .0    10.5     4.1      31      22      53      37      17      20       **
** 9/ 3/80      2015     .0     9.3     5.8       7      29      10      44       3      24       **
** 9/ 3/80      2030     .0    11.2     3.7       8      24      14      44       4      24       **
** 9/ 3/80      2045     .0     9.0     5.8       2      30       3      45       0      24       **
** 9/ 3/80      2100     .0     8.8     5.9      26      30      38      44      12      24       **
** 9/ 3/80      2115     .0    10.8     3.6       0      22       0      38       0      21       **
** 9/ 3/80      2130     .0    10.1     4.8       1      26       1      43       0      23       **
** 9/ 3/80      2145     .0     9.1     5.9      10      31      15      47       5      25       **
** 9/ 3/80      2200     .0     9.9     5.1       0      28       0      45       0      24       **
** 9/ 3/80      2215     .0     8.6     6.1      18      30      26      43       8      23       **
** 9/ 3/80      2230     .0     9.6     5.2      22      28      34      44      11      24       **
** 9/ 3/80      2245     .0    10.3     4.3      28      26      47      43      15      23       **
** 9/ 3/80      2300     .0     9.6     5.2      13      30      20      47       6      25       **
** 0/ 0/ 0         0     .0      .0      .0       0       0       0       0       0       0   *   **
** 0/ 0/ 0         0     .0      .0      .0       0       0       0       0       0       0   *   **
** 0/ 0/ 0         0     .0      .0      .0       0       0       0       0       0       0   *   **
** 0/ 0/ 0         0     .0      .0      .0       0       0       0       0       0       0   *   **
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*************************************************************************************************
**                                        15 MIN. DATA                                         **
**                               DRY STACK GAS CONCENTRATION                                   **
**                                                                                             **
**                                O2     CO2     CO      NO      CO      NO      CO      NO  ACUDE **
**                        LOAD   VOL%   VOL%    PPMV    PPMV    PPMV    PPMV   NG/J    NG/J      **
**   DATE         TIME    MWTH   MEAS   MEAS    MEAS    MEAS    3%O2    3%O2                     **
*************************************************************************************************
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 0/ 0/ 0          0      .0     .0     .0       0       0       0       0       0       0   *  **
** 9/ 4/80        515      .0    6.2    8.4       3      41       3      49       1      27      **
** 9/ 4/80        530      .0    5.8    8.7       0      42       0      49       0      27      **
** 9/ 4/80        545      .0    4.4    9.4     554      45     601      48     198      26      **
** 9/ 4/80        600      .0    4.6    9.3     399      44     438      48     144      26      **
** 9/ 4/80        615      .0    4.9    9.1     142      44     158      49      52      26      **
** 9/ 4/80        630      .0    4.6    9.3      10      44      10      48       3      26      **
** 9/ 4/80        645      .0    4.0    9.6     616      46     652      48     215      26      **
** 9/ 4/80        700      .0    3.9    9.6     588      46     619      48     204      26      **
** 9/ 4/80        715      .0    3.8    9.7     600      46     628      48     207      26      **
** 9/ 4/80        730      .0    3.8    9.7     547      46     572      48     189      26      **
** 9/ 4/80        745      .0    4.0    9.5     540      46     571      48     188      26      **
** 9/ 4/80        800      .0    4.1    9.5     564      46     600      49     198      26      **
** 9/ 4/80        815      .0    4.7    9.2       0      45       0      49       0      26      **
** 9/ 4/80        830      .0    5.3    8.9      11      43      12      49       4      26      **
** 9/ 4/80        845      .0    5.4    8.9      36      44      41      50      13      27      **
** 9/ 4/80        900      .0    5.7    8.7      33      44      38      51      12      28      **
** 9/ 4/80        915      .0    5.8    8.6       7      43       8      50       2      27      **
** 9/ 4/80        930      .0    7.1    7.7      16      45      20      58       6      31      **
** 9/ 4/80        945      .0    5.8    8.5       4      45       4      53       1      28      **
** 9/ 4/80       1000      .0    5.9    8.5      34      46      40      54      13      29      **
** 9/ 4/80       1015      .0    6.0    8.4       0      46       0      55       0      29      **
** 9/ 4/80       1030      .0    5.6    8.7       4      47       4      54       1      29      **
** 9/ 4/80       1045      .0    5.2    8.9      42      47      47      53      15      29      **
** 9/ 4/80       1100      .0    5.6    8.6      13      47      15      54       5      29      **
** 9/ 4/80       1115      .0    5.5    8.7      14      46      16      53       5      29      **
** 9/ 4/80       1130      .0    5.8    8.6      11      45      13      53       4      28      **
** 9/ 4/80       1145      .0    5.8    8.5      17      44      20      52       6      28      **
** 9/ 4/80       1200      .0    5.8    8.5      63      43      74      50      24      27      **
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*******************************************************************************************************
**
**                                           15 MIN. DATA
**                                   DRY STACK GAS CUNCENTRATIUN                                      **
**                                                                                                    **
**                              O2      CO2      CO      NO      CU      NO                           **
**                     LUAD    VOL%    VOL%     PPMV    PPMV    PPMV    PPMV     CO      NO   ACUDE   **
**   DATE      TIME    MWTH    MEAS    MEAS     MEAS    MEAS    3%O2    3%O2    NG/J    NG/J          **
*******************************************************************************************************
** 9/ 4/80     1215     .0     6.0     8.4       59      43      70      51      23      28           **
** 9/ 4/80     1230     .0     6.2     8.3        6      42       7      51       2      27           **
** 9/ 4/80     1245     .0     6.2     8.2       26      41      31      49      10      27           **
** 9/ 4/80     1300     .0     5.7     8.5       49      41      57      48      19      26           **
** 9/ 4/80     1315     .0     5.7     8.6       10      42      11      49       3      26           **
** 9/ 4/80     1330     .0     5.0     8.9       40      43      45      48      14      26           **
** 9/ 4/80     1345     .0     5.6     8.7       11      50      12      58       4      31           **
** 9/ 4/80     1400     .0     5.9     8.5       11      48      13      57       4      31           **
** 9/ 4/80     1415     .0     6.1     8.4       41      48      49      58      16      31           **
** 9/ 4/80     1430     .0     6.1     8.3       32      46      38      55      12      30           **
** 9/ 4/80     1445     .0     5.8     8.5       41      46      48      54      16      29           **
** 9/ 4/80     1500     .0     5.9     8.4       25      48      29      57       9      31           **
** 9/ 4/80     1515     .0     5.5     8.7        0      48       0      55       0      30           **
** 9/ 4/80     1530     .0     5.7     8.7       45      49      52      57      17      31           **
** 9/ 4/80     1545     .0     5.7     8.6       44      49      51      57      17      31           **
** 9/ 4/80     1600     .0     6.2     8.2       23      48      28      58       9      31           **
** 9/ 4/80     1615     .0     6.1     8.3       20      48      24      58       7      31           **
** 9/ 4/80     1630     .0     5.8     8.5       18      51      21      60       7      32           **
** 9/ 4/80     1645     .0     6.1     8.4       61      48      73      58      24      31           **
** 9/ 4/80     1700     .0     5.6     8.6       26      50      30      58      10      31           **
** 9/ 4/80     1715     .0     5.7     8.6       26      50      30      58      10      31           **
** 9/ 4/80     1730     .0     5.7     8.6       13      50      15      58       5      31           **
** 9/ 4/80     1745     .0     5.6     8.7       18      51      21      59       6      32           **
** 9/ 4/80     1800     .0     5.8     8.5       75      50      88      59      29      32           **
** 9/ 4/80     1815     .0     5.3     8.8       13      51      14      58       4      31           **
** 9/ 4/80     1830     .0     5.9     8.4       17      49      20      58       6      31           **
** 9/ 4/80     1845     .0     6.1     8.4       23      49      27      59       9      32           **
** 9/ 4/80     1900     .0     6.8     7.9       20      47      25      59       8      32           **
** 9/ 4/80     1915     .0     6.8     7.9       19      46      24      58       7      31           **
** 9/ 4/80     1930     .0     6.9     7.8       20      46      25      58       8      31           **
** 9/ 4/80     1945     .0     6.4     8.2       23      47      28      58       9      31           **
** 9/ 4/80     2000     .0     7.1     7.7       18      47      23      60       7      33           **
** 9/ 4/80     2015     .0     6.8     8.0       18      48      22      60       7      33           **
** 9/ 4/80     2030     .0     7.1     7.7       19      48      24      62       8      33           **
** 9/ 4/80     2045     .0     6.6     8.0       23      50      28      62       9      33           **
** 9/ 4/80     2100     .0     6.6     8.1       18      49      22      61       7      33           **
** 9/ 4/80     2115     .0     6.7     8.0       21      49      26      61       8      33           **
** 9/ 4/80     2130     .0     6.3     8.2       28      49      34      60      11      32           **
** 9/ 4/80     2145     .0     6.5     8.1       25      49      31      60      10      33           **
** 9/ 4/80     2200     .0     6.6     8.2       24      50      30      62       9      33           **
** 9/ 4/80     2215     .0     6.6     8.1       29      51      36      63      11      34           **
** 9/ 4/80     2230     .0     6.2     8.4       31      50      37      60      12      33           **
** 9/ 4/80     2245     .0     6.4     8.2       25      51      30      62      10      34           **
** 9/ 4/80     2300     .0     6.5     8.2       33      51      41      63      13      34           **
** 0/ 0/ 0        0     .0      .0      .0        0       0       0       0       0       0     .     **
** 0/ 0/ 0        0     .0      .0      .0        0       0       0       0       0       0     .     **
** 0/ 0/ 0        0     .0      .0      .0        0       0       0       0       0       0     .     **
** 0/ 0/ 0        0     .0      .0      .0        0       0       0       0       0       0     .     **
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**                              15 MIN. DATA                                        **
**                       DRY STACK GAS CONCENTRATION                                **
**                                                                                  **
**                         O2     CO2     CO     NO     CO     NO     CO     NO  ACODE **
**                 LOAD   VOL%   VOL%   PPMV   PPMV   PPMV   PPMV   NG/J   NG/J      **
**  DATE    TIME   MWTH   MEAS   MEAS   MEAS   MEAS   3%O2   3%O2                    **
**************************************************************************************
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 0/ 0/ 0     0    .0     .0     .0      0      0      0      0      0      0   *   **
** 9/ 5/80   515    .0    6.6    8.2      0     51      0     63      0     34       **
** 9/ 5/80   530    .0    6.5    8.4      0     56      0     69      0     37       **
** 9/ 5/80   545    .0    5.4    9.0      4     55      4     63      1     34       **
** 9/ 5/80   600    .0    5.0    9.2     33     56     37     63     12     34       **
** 9/ 5/80   615    .0    4.8    9.2     41     56     45     62     15     33       **
** 9/ 5/80   630    .0    4.7    9.4    143     57    158     62     52     34       **
** 9/ 5/80   645    .0    3.9    9.7    156     59    164     62     54     33       **
** 9/ 5/80   700    .0    4.3    9.5    408     58    439     62    145     33       **
** 9/ 5/80   715    .0    4.4    9.5     55     59     59     64     19     34       **
** 9/ 5/80   730    .0    4.9    9.2     44     57     49     63     16     34       **
** 9/ 5/80   745    .0    5.1    9.2     71     57     80     64     26     35       **
** 9/ 5/80   800    .0    5.4    8.9      0     56      0     64      0     35       **
** 9/ 5/80   815    .0    5.4    9.0      0     56      0     64      0     35       **
** 9/ 5/80   830    .0    6.0    8.6      3     54      3     64      1     35       **
** 9/ 5/80   845    .0    5.6    8.8      6     55      7     64      2     34       **
** 9/ 5/80   900    .0   -1.0   -1.0     -1     -1      0      0      0      0   C   **
** 9/ 5/80   915    .0    5.8    8.7     60     52     71     61     23     33       **
** 9/ 5/80   930    .0    6.0    8.6     29     47     34     56     11     30       **
** 9/ 5/80   945    .0    6.1    8.5     76     47     91     56     30     30       **
** 9/ 5/80  1000    .0    5.8    8.6     96     47    113     55     37     30       **
** 9/ 5/80  1015    .0    5.4    8.9    139     48    160     55     53     30       **
** 9/ 5/80  1030    .0    5.4    8.8     15     48     17     55      5     30       **
** 9/ 5/80  1045    .0    5.2    8.9     80     50     91     57     30     30       **
** 9/ 5/80  1100    .0    5.9    8.5     21     48     25     57      8     31       **
** 9/ 5/80  1115    .0    5.3    8.8     72     49     82     56     27     30       **
** 9/ 5/80  1130    .0    5.7    8.6     11     49     12     57      4     31       **
** 9/ 5/80  1145    .0    4.8    9.1    105     49    116     54     38     29       **
** 9/ 5/80  1200    .0    5.3    8.8    150     48    172     55     56     29       **
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*******************************************************************************************************
**                                        15 MIN. DATA                                                **
**                                DRY STACK GAS CONCENTRATION                                         **
**                                                                                                    **
**                                  O2      CO2      CO      NO      CO      NO      CO      NO  ACUDE **
**                         LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J       **
**   DATE        TIME      MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                       **
*******************************************************************************************************
** 9/ 5/80       1215        .0     5.7     8.6      17      49      20      57       6      31       **
** 9/ 5/80       1230        .0     5.7     8.6      10      48      11      56       3      30       **
** 9/ 5/80       1245        .0     5.9     8.5      10      48      11      57       3      31       **
** 9/ 5/80       1300        .0     5.9     8.4      37      47      44      56      14      30       **
** 9/ 5/80       1315        .0    -1.0    -1.0      -1      -1       0       0       0       0   C   **
** 9/ 5/80       1330        .0     5.7     8.6      15      47      17      55       5      30       **
** 9/ 5/80       1345        .0     5.6     8.8      56      48      65      56      21      30       **
** 9/ 5/80       1400        .0     5.5     8.6      51      46      59      53      19      29       **
** 9/ 5/80       1415        .0     5.8     8.6      55      46      65      54      21      29       **
** 9/ 5/80       1430        .0     5.6     8.6      59      46      69      53      22      29       **
** 9/ 5/80       1445        .0     5.7     8.6      27      47      31      55      10      30       **
** 9/ 5/80       1500        .0     6.0     8.4      59      46      70      55      23      29       **
** 9/ 5/80       1515        .0     5.7     8.6      25      46      29      54       9      29       **
** 9/ 5/80       1530        .0     6.1     8.3      37      44      44      53      14      28       **
** 9/ 5/80       1545        .0     5.9     8.5      53      44      63      52      20      28       **
** 9/ 5/80       1600        .0     6.1     8.3      38      44      45      53      15      28       **
** 9/ 5/80       1615        .0     6.0     8.4      31      44      37      52      12      28       **
** 9/ 5/80       1630        .0     6.0     8.4       9      42      10      50       3      27       **
** 9/ 5/80       1645        .0     5.7     8.6      15      43      17      50       5      27       **
** 9/ 5/80       1700        .0     6.0     8.4      37      44      44      52      14      28       **
** 9/ 5/80       1715        .0     6.7     8.0      18      45      22      56       7      30       **
** 9/ 5/80       1730        .0     6.8     8.0      27      45      34      57      11      30       **
** 9/ 5/80       1745        .0     6.5     8.1      26      44      32      54      10      29       **
** 9/ 5/80       1800        .0     6.6     8.1      26      44      32      55      10      29       **
** 9/ 5/80       1815        .0     6.4     8.2      22      45      27      55       8      30       **
** 9/ 5/80       1830        .0     6.3     8.4      30      43      36      52      12      28       **
** 9/ 5/80       1845        .0     6.3     8.3      27      43      33      52      10      28       **
** 9/ 5/80       1900        .0     6.4     8.3      24      43      29      53       9      28       **
** 9/ 5/80       1915        .0     6.3     8.4      33      43      40      52      13      28       **
** 9/ 5/80       1930        .0     6.2     8.4      33      43      40      52      13      28       **
** 9/ 5/80       1945        .0     6.3     8.3      45      43      55      52      18      28       **
** 9/ 5/80       2000        .0     6.3     8.2      35      42      42      51      14      27       **
** 9/ 5/80       2015        .0     6.2     8.5      25      43      30      52      10      28       **
** 9/ 5/80       2030        .0     6.8     8.2      37      42      46      53      15      28       **
** 9/ 5/80       2045        .0     6.8     8.3      50      43      63      54      20      29       **
** 9/ 5/80       2100        .0     6.9     8.2      32      43      40      54      13      29       **
** 9/ 5/80       2115        .0     6.7     8.3      43      43      54      54      17      29       **
** 9/ 5/80       2130        .0     7.0     8.1      37      43      47      55      15      30       **
** 9/ 5/80       2145        .0     7.0     8.1      15      44      19      56       6      30       **
** 9/ 5/80       2200        .0     7.0     8.1      27      44      34      56      11      30       **
** 9/ 5/80       2215        .0     6.6     8.3      10      44      12      55       4      29       **
** 9/ 5/80       2230        .0     6.5     8.3       3      44       3      54       1      29       **
** 9/ 5/80       2245        .0     6.6     8.3      22      45      27      56       9      30       **
** 9/ 5/80       2300        .0     6.8     8.2      29      45      36      57      12      30       **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0       0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0       0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0       0   *   **
** 0/ 0/ 0          0        .0      .0      .0       0       0       0       0       0       0   *   **
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****************************************************************************************************
**                                                                                                **
**                                          15 MIN. DATA                                          **
**                                  DRY STACK GAS CONCENTRATION                                   **
**                                                                                                **
**                                   O2     CO2     CO     NO     CO     NO     CO     NO         **
**                           LOAD   VOL%   VOL%   PPMV   PPMV   PPMV   PPMV                       **
**  DATE          TIME       MWTH   MEAS   MEAS   MEAS   MEAS   3%O2   3%O2   NG/J   NG/J  ACUDE  **
****************************************************************************************************
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 0/ 0/ 0           0         .0     .0     .0      0      0      0      0      0      0    •    **
** 9/ 8/80         515         .0    6.2    8.3      4     47      4     57      1     31         **
** 9/ 8/80         530         .0    6.5    8.2      3     47      3     58      1     31         **
** 9/ 8/80         545         .0    6.4    8.2     33     46     40     56     13     30         **
** 9/ 8/80         600         .0    6.6    8.1     33     46     41     57     13     31         **
** 9/ 8/80         615         .0    5.5    8.8      4     49      4     56      1     30         **
** 9/ 8/80         630         .0    4.1    9.6    531     51    565     54    186     29         **
** 9/ 8/80         645         .0    4.2    9.5    516     52    553     55    182     30         **
** 9/ 8/80         700         .0    4.4    9.4    362     51    392     55    129     30         **
** 9/ 8/80         715         .0    4.6    9.3    121     51    132     56     43     30         **
** 9/ 8/80         730         .0    4.9    9.2    327     51    365     57    120     30         **
** 9/ 8/80         745         .0    5.1    9.1    237     51    268     57     88     31         **
** 9/ 8/80         800         .0    5.1    9.1    202     51    228     57     75     31         **
** 9/ 8/80         815         .0    5.0    9.1    369     51    415     57    137     31         **
** 9/ 8/80         830         .0    4.9    9.1    319     52    356     58    117     31         **
** 9/ 8/80         845         .0    5.0    9.1    331     52    372     58    123     31         **
** 9/ 8/80         900         .0    4.8    9.2    287     52    319     57    105     31         **
** 9/ 8/80         915         .0    4.9    9.2    310     52    346     58    114     31         **
** 9/ 8/80         930         .0    4.7    9.2    251     53    277     58     91     31         **
** 9/ 8/80         945         .0    5.0    9.1    306     51    344     57    113     31         **
** 9/ 8/80        1000         .0    5.3    9.0    254     49    291     56     96     30         **
** 9/ 8/80        1015         .0    5.3    8.9    176     50    201     57     66     31         **
** 9/ 8/80        1030         .0    5.5    8.8    125     49    145     56     47     30         **
** 9/ 8/80        1045         .0    5.3    8.9     30     49     34     56     11     30         **
** 9/ 8/80        1100         .0    5.4    8.8    197     49    227     56     75     30         **
** 9/ 8/80        1115         .0    5.8    8.7     23     48     27     56      9     30         **
** 9/ 8/80        1130         .0    5.9    8.6     32     48     38     57     12     31         **
** 9/ 8/80        1145         .0    5.8    8.7     21     48     24     56      8     30         **
** 9/ 8/80        1200         .0    6.1    8.4      4     46      4     58      1     31         **
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**                                                                                                 **
**                                          15 MIN. DATA                                           **
**                                   DRY STACK GAS CONCENTRATIUN                                   **
**                                                                                                 **
**                              O2      CO2     CO      NO      CO      NO                         **
**                      LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    CO      NU  ACODE  **
**   DATE       TIME    MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2    NG/J    NG/J       **
*****************************************************************************************************
** 9/ 8/80      1215     .0     6.2     8.4      33      47      40      57      13      31        **
** 9/ 8/80      1230     .0     6.6     8.2      28      47      35      58      11      31        **
** 9/ 8/80      1245     .0     6.6     8.1      49      46      61      57      20      31        **
** 9/ 8/80      1300     .0     6.4     8.3      18      46      22      56       7      30        **
** 9/ 8/80      1315     .0     6.3     8.4      17      47      20      57       6      31        **
** 9/ 8/80      1330     .0     6.0     8.4      16      47      19      56       6      30        **
** 9/ 8/80      1345     .0     6.0     8.5      13      49      15      58       5      31        **
** 9/ 8/80      1400     .0     6.2     8.3      10      48      12      58       4      31        **
** 9/ 8/80      1415     .0     6.5     8.2       0      48       0      59       0      32        **
** 9/ 8/80      1430     .0     6.5     8.3      27      48      33      59      11      32        **
** 9/ 8/80      1445     .0     6.8     8.2      27      49      34      62      11      33        **
** 9/ 8/80      1500     .0     6.6     8.2      18      49      22      61       7      33        **
** 9/ 8/80      1515     .0     6.3     8.4       2      50       2      61       0      33        **
** 9/ 8/80      1530     .0     6.8     8.1      13      49      16      62       5      33        **
** 9/ 8/80      1545     .0     6.4     8.4      38      49      46      60      15      32        **
** 9/ 8/80      1600     .0     6.9     8.1      19      49      24      62       8      33        **
** 9/ 8/80      1615     .0     6.7     8.1       0      50       0      63       0      34        **
** 9/ 8/80      1630     .0     6.7     8.1      46      49      57      61      19      33        **
** 9/ 8/80      1645     .0     6.6     8.2      61      50      76      62      25      33        **
** 9/ 8/80      1700     .0     6.8     7.9      33      48      41      60      13      33        **
** 9/ 8/80      1715     .0     7.0     8.1      44      48      56      61      18      33        **
** 9/ 8/80      1730     .0     6.9     8.1      32      47      40      60      13      32        **
** 9/ 8/80      1745     .0     7.4     7.8      34      47      45      62      14      33        **
** 9/ 8/80      1800     .0     7.2     7.9      19      47      24      61       8      33        **
** 9/ 8/80      1815     .0     7.0     8.1      37      46      47      59      15      32        **
** 9/ 8/80      1830     .0     6.9     8.1      23      47      29      60       9      32        **
** 9/ 8/80      1845     .0     7.1     7.9      32      48      41      62      13      33        **
** 9/ 8/80      1900     .0     7.0     8.0      51      48      65      61      21      33        **
** 9/ 8/80      1915     .0     7.2     8.0      49      49      64      64      21      34        **
** 9/ 8/80      1930     .0     7.1     8.0       4      49       5      63       1      34        **
** 9/ 8/80      1945     .0     7.1     8.1      49      49      63      63      20      34        **
** 9/ 8/80      2000     .0     7.4     8.0      15      48      19      63       6      34        **
** 9/ 8/80      2015     .0     7.3     8.0       4      49       5      64       1      34        **
** 9/ 8/80      2030     .0     6.9     8.3      41      49      52      62      17      33        **
** 9/ 8/80      2045     .0     7.0     8.1       8      49      10      63       3      34        **
** 9/ 8/80      2100     .0     6.9     8.2       5      49       6      62       2      33        **
** 9/ 8/80      2115     .0     6.8     8.3       0      50       0      63       0      34        **
** 9/ 8/80      2130     .0     6.9     8.2       0      49       0      62       0      33        **
** 9/ 8/80      2145     .0     6.6     8.4      25      49      31      61      10      33        **
** 9/ 8/80      2200     .0     6.4     8.5      60      49      74      60      24      32        **
** 9/ 8/80      2215     .0     6.2     8.5       9      49      10      59       3      32        **
** 9/ 8/80      2230     .0     6.6     8.4       0      50       0      62       0      33        **
** 9/ 8/80      2245     .0     6.0     8.7      39      50      46      60      15      32        **
** 9/ 8/80      2300     .0     6.7     8.3       0      49       0      61       0      33        **
** 9/ 8/80      2315     .0     6.9     8.2       1      50       1      63       0      34        **
** 0/ 0/ 0         0     .0      .0      .0       0       0       0       0       0       0   .    **
** 0/ 0/ 0         0     .0      .0      .0       0       0       0       0       0       0   .    **
** 0/ 0/ 0         0     .0      .0      .0       0       0       0       0       0       0   .    **
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*******************************************************************************************
**                                         15 MIN. DATA                                  **
**                                DRY STACK GAS CONCENTRATION                            **
**                                                                                       **
**                              O2      CO2      CO       NO      CO      NO     CO      NO   ACODE  **
**                     LOAD    VOL%    VOL%     PPMV     PPMV    PPMV    PPMV   NG/J    NG/J        **
**    DATE     TIME    MWTH    MEAS    MEAS     MEAS     MEAS    3%O2    3%O2                       **
*******************************************************************************************
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 0/ 0/ 0       0      .0      .0      .0       0        0       0       0      0       0    *    **
** 9/ 9/80     515      .0     6.0     8.9     198       52     237      62     78      33         **
** 9/ 9/80     530      .0     6.5     8.6      38       51      47      63     15      34         **
** 9/ 9/80     545      .0     5.3     9.3     562       53     644      60    212      32         **
** 9/ 9/80     600      .0     2.8    10.4    2168       55    2144      54    707      29         **
** 9/ 9/80     615      .0     2.6    10.4    2276       55    2226      53    735      29         **
** 9/ 9/80     630      .0     2.6    10.4    2276       55    2226      53    735      29         **
** 9/ 9/80     645      .0     2.4    10.4    2275       56    2201      54    726      29         **
** 9/ 9/80     700      .0     2.4    10.4    2273       56    2199      54    726      29         **
** 9/ 9/80     715      .0     2.4    10.4    2274       55    2200      53    726      28         **
** 9/ 9/80     730      .0     2.7    10.2    2065       56    2030      55    670      29         **
** 9/ 9/80     745      .0     2.9    10.2    2019       56    2007      55    662      30         **
** 9/ 9/80     800      .0     3.5     9.9    1775       56    1826      57    602      31         **
** 9/ 9/80     815      .0     4.3     9.6    1063       55    1146      59    378      32         **
** 9/ 9/80     830      .0    -1.0    -1.0      -1       -1       0       0      0       0    C    **
** 9/ 9/80     845      .0     4.6     9.4     190       53     208      58     68      31         **
** 9/ 9/80     900      .0     4.8     9.3    1348       50    1498      55    494      30         **
** 9/ 9/80     915      .0     5.3     9.0    1107       49    1270      56    419      30         **
** 9/ 9/80     930      .0     5.5     8.8     120       48     139      55     46      30         **
** 9/ 9/80     945      .0     5.7     8.7     727       48     856      56    282      30         **
** 9/ 9/80    1000      .0     5.7     8.7     140       48     164      56     54      30         **
** 9/ 9/80    1015      .0     7.5     7.6      30       50      40      66     13      36         **
** 9/ 9/80    1030      .0     8.3     7.0      68       47      96      66     31      36         **
** 9/ 9/80    1045      .0     9.1     6.5       0       44       0      66      0      36         **
** 9/ 9/80    1100      .0     9.9     5.9       2       41       3      66      1      36         **
** 9/ 9/80    1115      .0     9.8     6.0      13       41      20      66      6      35         **
** 9/ 9/80    1130      .0     9.9     5.8       9       40      14      65      4      35         **
** 9/ 9/80    1145      .0     9.6     6.0       3       40       4      63      1      34         **
** 9/ 9/80    1200      .0     9.6     6.0      16       40      25      63      8      34         **
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**                                                15 MIN. DATA                                      **
**                                       DRY STACK GAS CONCENTRATION                                **
**                                                                                                  **
**                             O2     CO2      CO      NO      CO      NO      CO      NO   ACUDE   **
**                   LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J    NG/J           **
**    DATE    TIME   MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                           **
******************************************************************************************************
** 9/ 9/80    1215     .0     9.8     6.0      31      41      49      66      16      35           **
** 9/ 9/80    1230     .0     9.9     5.7      44      40      71      65      23      35           **
** 9/ 9/80    1245     .0     9.6     6.0       0      43       0      68       0      36           **
** 9/ 9/80    1300     .0    10.3     5.3       3      36       5      60       1      32           **
** 9/ 9/80    1315     .0    10.0     5.8      24      39      39      64      13      34           **
** 9/ 9/80    1330     .0    10.3     5.3      16      37      27      62       8      33           **
** 9/ 9/80    1345     .0     9.8     5.8      15      40      24      64       7      34           **
** 9/ 9/80    1400     .0    10.1     5.5      23      38      38      62      12      34           **
** 9/ 9/80    1415     .0    10.3     5.3      13      37      21      62       7      33           **
** 9/ 9/80    1430     .0    10.1     5.6       5      38       8      62       2      34           **
** 9/ 9/80    1445     .0     9.9     5.8       6      39       9      63       3      34           **
** 9/ 9/80    1500     .0    10.3     5.5       2      37       3      62       1      33           **
** 9/ 9/80    1515     .0     9.8     5.9      14      40      22      64       7      34           **
** 9/ 9/80    1530     .0    10.1     5.5       4      39       6      64       2      35           **
** 9/ 9/80    1545     .0    10.3     5.4      25      38      42      64      13      34           **
** 9/ 9/80    1600     .0    10.4     5.2      24      36      40      61      13      33           **
** 9/ 9/80    1615     .0    10.5     5.1      14      37      24      63       7      34           **
** 9/ 9/80    1630     .0    10.4     5.1      14      37      23      63       7      34           **
** 9/ 9/80    1645     .0    10.5     5.2      14      37      24      63       7      34           **
** 9/ 9/80    1700     .0    10.6     5.1      24      35      41      60      13      32           **
** 9/ 9/80    1715     .0    10.4     5.3      23      38      39      64      12      35           **
** 9/ 9/80    1730     .0    10.3     5.4      13      38      21      64       7      34           **
** 9/ 9/80    1745     .0    10.6     5.2      14      37      24      64       8      34           **
** 9/ 9/80    1800     .0    10.8     4.9      12      34      21      60       7      32           **
** 9/ 9/80    1815     .0    10.4     5.4      15      38      25      64       8      35           **
** 9/ 9/80    1830     .0    10.6     5.2      12      37      20      64       6      34           **
** 9/ 9/80    1845     .0    10.3     5.4      18      39      30      65      10      35           **
** 9/ 9/80    1900     .0    10.4     5.4      15      39      25      66       8      36           **
** 9/ 9/80    1915     .0    10.3     5.4      14      38      23      64       7      34           **
** 9/ 9/80    1930     .0    10.5     5.2      12      39      20      67       6      36           **
** 9/ 9/80    1945     .0    10.4     5.4      13      39      22      66       7      36           **
** 9/ 9/80    2000     .0    10.3     5.4      18      39      30      65      10      35           **
** 9/ 9/80    2015     .0    10.3     5.4      14      40      23      67       7      36           **
** 9/ 9/80    2030     .0    10.4     5.4      15      38      25      64       8      35           **
** 9/ 9/80    2045     .0    10.6     5.3      12      39      20      67       6      36           **
** 9/ 9/80    2100     .0    10.2     5.6      14      40      23      66       7      36           **
** 9/ 9/80    2115     .0    10.1     5.7      14      40      23      66       7      35           **
** 9/ 9/80    2130     .0    10.2     5.6      14      40      23      66       7      36           **
** 9/ 9/80    2145     .0    10.4     5.4      14      38      23      64       7      35           **
** 9/ 9/80    2200     .0    10.3     5.5      28      38      47      64      15      34           **
** 9/ 9/80    2215     .0    10.1     5.6      16      40      26      66       8      35           **
** 9/ 9/80    2230     .0    10.2     5.5      21      40      35      66      11      36           **
** 9/ 9/80    2245     .0    10.2     5.6      16      40      26      66       8      36           **
** 9/ 9/80    2300     .0    10.5     5.2      41      38      70      65      23      35           **
** 0/ 0/ 0       0     .0      .0      .0       0       0       0       0       0       0       *   **
** 0/ 0/ 0       0     .0      .0      .0       0       0       0       0       0       0       *   **
** 0/ 0/ 0       0     .0      .0      .0       0       0       0       0       0       0       *   **
** 0/ 0/ 0       0     .0      .0      .0       0       0       0       0       0       0       *   **
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**                                       15 MIN. DATA                                    **
**                                DRY STACK GAS CONCENTRATION                            **
**                                                                                       **
**                            O2      CO2     CO      NO      CO      NO      CO     NO  ACUDE  **
**                    LOAD    VOL%    VOL%    PPMV    PPMV    PPMV    PPMV    NG/J   NG/J       **
**  DATE      TIME    MWTH    MEAS    MEAS    MEAS    MEAS    3%O2    3%O2                      **
*******************************************************************************************
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 0/ 0/ 0       0      .0      .0      .0       0       0       0       0       0      0   *   **
** 9/10/80     500      .0    13.0     2.8       2      23       4      52       1     28       **
** 9/10/80     515      .0    10.0     5.7      11      39      18      64       5     34       **
** 9/10/80     530      .0    10.3     5.2      11      38      18      64       6     34       **
** 9/10/80     545      .0     9.4     6.1     337      41     524      63     173     34       **
** 9/10/80     600      .0     7.0     7.8     873      47    1124      60     371     32       **
** 9/10/80     615      .0     7.3     7.7     885      46    1164      60     384     32       **
** 9/10/80     630      .0     7.8     7.2     697      45     952      61     314     33       **
** 9/10/80     645      .0     6.9     7.8     880      48    1125      61     371     33       **
** 9/10/80     700      .0     6.7     8.0     842      48    1061      60     350     32       **
** 9/10/80     715      .0     6.9     7.8    1003      49    1282      62     423     33       **
** 9/10/80     730      .0     7.2     7.4     539      49     704      64     232     34       **
** 9/10/80     745      .0     6.9     7.7     887      48    1134      61     374     33       **
** 9/10/80     800      .0     6.7     7.9     927      49    1168      61     385     33       **
** 9/10/80     815      .0     6.8     7.8     914      49    1160      62     383     33       **
** 9/10/80     830      .0     7.0     7.0     713      48     918      61     303     33       **
** 9/10/80     845      .0     8.0     6.9      78      46     108      63      35     34       **
** 9/10/80     900      .0     7.4     7.4     677      46     897      60     296     33       **
** 9/10/80     915      .0     8.0     7.1     637      45     883      62     291     33       **
** 9/10/80     930      .0     8.7     6.9      38      44      55      64      18     35       **
** 9/10/80     945      .0     8.4     6.8      64      44      91      63      30     34       **
** 9/10/80    1000      .0     8.0     7.2     420      45     582      62     192     33       **
** 9/10/80    1015      .0    -1.0    -1.0      -1      -1       0       0       0      0   C   **
** 9/10/80    1030      .0    -1.0    -1.0      -1      -1       0       0       0      0   C   **
** 9/10/80    1045      .0    -1.0    -1.0      -1      -1       0       0       0      0   C   **
** 9/10/80    1100      .0    -1.0    -1.0      -1      -1       0       0       0      0   C   **
** 9/10/80    1115      .0    -1.0    -1.0      -1      -1       0       0       0      0   C   **
** 9/10/80    1130      .0     9.8     5.0      29      41      46      66      15     35       **
** 9/10/80    1145      .0     9.0     5.7      37      40      55      60      18     32       **
** 9/10/80    1200      .0    10.0     5.8      47      39      77      64      25     34       **
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**                                                                                                          **
**                                               15 MIN. DATA                                               **
**                                      DRY STACK GAS CONCENTRATION                                         **
**                                                                                                          **
**                            O2       CO2      CO       NO       CO       NO                               **
**                   LOAD    VOL%     VOL%     PPMV     PPMV     PPMV     PPMV     CO       NO    ACODE     **
**  DATE     TIME    MWTH    MEAS     MEAS     MEAS     MEAS     3%O2     3%O2    NG/J     NG/J             **
**************************************************************************************************************
** 9/10/80   1215     .0      9.7      6.0      17       41       27       65       8       35              **
** 9/10/80   1230     .0     10.0      5.7      14       40       22       65       7       35              **
** 9/10/80   1245     .0      9.9      5.9      14       39       22       63       7       34              **
** 9/10/80   1300     .0     10.0      5.6      23       39       37       64      12       34              **
** 9/10/80   1315     .0     10.0      5.7       1       39        1       64       0       34              **
** 9/10/80   1330     .0     10.0      5.6       0       37        0       60       0       32              **
** 9/10/80   1345     .0     10.2      5.7      54       38       90       63      29       34              **
** 9/10/80   1400     .0     10.1      5.6       0       37        0       61       0       33              **
** 9/10/80   1415     .0     10.3      5.6      39       37       65       62      21       33              **
** 9/10/80   1430     .0     10.1      5.5      32       37       53       61      17       33              **
** 9/10/80   1445     .0     10.4      5.4      39       36       66       61      21       33              **
** 9/10/80   1500     .0     10.2      5.5      16       37       26       61       8       33              **
** 9/10/80   1515     .0     10.3      5.5      33       36       55       60      18       32              **
** 9/10/80   1530     .0     10.2      5.5       3       36        5       60       1       32              **
** 9/10/80   1545     .0     10.2      5.7      58       37       97       61      32       33              **
** 9/10/80   1600     .0      9.9      5.8       5       38        8       61       2       33              **
** 9/10/80   1615     .0     10.6      5.4      35       35       60       60      20       32              **
** 9/10/80   1630     .0     10.7      5.2      21       35       36       61      12       33              **
** 9/10/80   1645     .0     10.7      5.2      19       36       33       63      11       34              **
** 9/10/80   1700     .0     11.2      4.8      15       32       27       59       9       32              **
** 9/10/80   1715     .0     11.2      4.8      15       33       27       60       9       33              **
** 9/10/80   1730     .0     11.1      5.0      14       34       25       62       8       33              **
** 9/10/80   1745     .0     11.0      5.0      14       34       25       61       8       33              **
** 9/10/80   1800     .0     11.0      5.0      14       33       25       59       8       32              **
** 9/10/80   1815     .0     10.9      5.3      42       33       75       59      24       32              **
** 9/10/80   1830     .0     10.5      5.6      41       35       70       60      23       32              **
** 9/10/80   1845     .0     10.7      5.5      34       35       59       61      19       33              **
** 9/10/80   1900     .0     11.1      5.2      31       33       56       60      18       32              **
** 9/10/80   1915     .0     11.1      5.3      16       34       29       62       9       33              **
** 9/10/80   1930     .0     10.9      5.4      31       35       55       62      18       33              **
** 9/10/80   1945     .0     11.0      5.3      22       33       39       59      13       32              **
** 9/10/80   2000     .0     10.8      5.4      35       35       62       62      20       33              **
** 9/10/80   2015     .0     10.8      5.5      37       35       65       62      21       33              **
** 9/10/80   2030     .0     10.9      5.3      34       34       60       60      20       33              **
** 9/10/80   2045     .0     10.7      5.5      11       35       19       61       6       33              **
** 9/10/80   2100     .0     10.7      5.3      12       34       21       59       6       32              **
** 9/10/80   2115     .0     10.5      5.7      23       37       39       63      13       34              **
** 9/10/80   2130     .0     10.3      5.7      21       37       35       62      11       33              **
** 9/10/80   2145     .0     10.4      5.6       0       36        0       61       0       33              **
** 9/10/80   2200     .0     10.4      5.7      51       37       86       63      28       34              **
** 9/10/80   2215     .0     10.4      5.7      24       37       40       63      13       34              **
** 9/10/80   2230     .0     10.6      5.7       0       36        0       62       0       33              **
** 9/10/80   2245     .0     10.4      5.9      44       37       75       63      24       34              **
** 9/10/80   2300     .0     10.6      5.8      33       37       57       64      18       34              **
** 9/10/80   2315     .0     10.8      5.4      10       35       17       62       5       33              **
** 0/ 0/ 0      0     .0       .0       .0       0        0        0        0       0        0     *        **
** 0/ 0/ 0      0     .0       .0       .0       0        0        0        0       0        0     *        **
** 0/ 0/ 0      0     .0       .0       .0       0        0        0        0       0        0     *        **
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**************************************************************************************************
**                                          15 MIN. DATA                                        **
**                                  DRY STACK GAS CONCENTRATION                                 **
**                                                                                              **
**                               O2      CO2      CO       NO       CO       NO       CO      NO   ACODE  **
**                      LOAD    VOL%     VOL%     PPMV     PPMV     PPMV     PPMV     NG/J    NG/J        **
**    DATE      TIME    MWTH    MEAS     MEAS     MEAS     MEAS     3%O2     3%O2                         **
**************************************************************************************************
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 0/ 0/ 0        0      .0      .0       .0        0        0        0        0        0       0    ●    **
** 9/11/80      500      .0    11.3      5.1       48       33       89       61       29      33         **
** 9/11/80      515      .0     9.4      6.6       21       39       32       60       10      32         **
** 9/11/80      530      .0     9.8      6.2        0       38        0       61        0      33         **
** 9/11/80      545      .0     7.0      8.0      952       44     1225       56      404      30         **
** 9/11/80      600      .0     6.4      8.2      267       46      329       56      108      30         **
** 9/11/80      615      .0     6.2      8.4     1208       46     1470       56      485      30         **
** 9/11/80      630      .0     5.6      8.6     1215       47     1421       54      469      29         **
** 9/11/80      645      .0     5.0      8.9     1314       47     1479       52      488      28         **
** 9/11/80      700      .0     5.9      8.5     1093       46     1304       54      430      29         **
** 9/11/80      715      .0     5.9      8.5     1110       46     1324       54      437      29         **
** 9/11/80      730      .0     6.2      8.4      955       46     1162       56      383      30         **
** 9/11/80      745      .0     5.9      8.5     1042       46     1243       54      410      29         **
** 9/11/80      800      .0     6.1      8.5     1128       46     1364       55      450      30         **
** 9/11/80      815      .0     5.9      8.5      987       46     1177       54      388      29         **
** 9/11/80      830      .0     6.4      8.3      748       62      923       76      304      41         **
** 9/11/80      845      .0    -1.0     -1.0       -1       -1        0        0        0       0    C    **
** 9/11/80      900      .0     5.9      8.5      717       49      855       58      282      31         **
** 9/11/80      915      .0     6.2      8.4      559       49      680       59      224      32         **
** 9/11/80      930      .0     6.1      8.5      298       48      360       58      119      31         **
** 9/11/80      945      .0     6.5      8.2      803       47      998       58      329      31         **
** 9/11/80     1000      .0     7.0      7.9      592       46      762       59      251      32         **
** 9/11/80     1015      .0     6.9      8.0      632       46      808       58      266      31         **
** 9/11/80     1030      .0    -1.0     -1.0       -1       -1        0        0        0       0    C    **
** 9/11/80     1045      .0     8.0      7.4       50       43       69       59       22      32         **
** 9/11/80     1100      .0     8.4      7.1       13       42       18       60        6      32         **
** 9/11/80     1115      .0     8.7      7.0        0       38        0       55        0      30         **
** 9/11/80     1130      .0    -1.0     -1.0       -1       -1        0        0        0       0    C    **
** 9/11/80     1145      .0     9.0      6.6       95       42      142       63       47      34         **
** 9/11/80     1200      .0     9.0      6.5        3       42        4       63        1      34         **
**************************************************************************************************
```

```
******************************************************************************************************
**                                            15 MIN, DATA                                          **
**                                   DRY STACK GAS CONCENTRATION                         .          **
**                                                                                                  **
**                            O2      CO2      CO       NO       CU       NO       CO       NO  ACUDE **
**                     LOAD   VOL%    VOL%     PPMV     PPMV     PPMV     PPMV     NG/J     NG/J      **
**   DATE       TIME   MWTH   MEAS    MEAS     MEAS     MEAS     3%U2     3%O2                        **
******************************************************************************************************
** 9/11/80     1215     .0     9.3     6.3        2       39        3       60        1       32       **
** 9/11/80     1230     .0    -1.0    -1.0       -1       -1        0        0        0        0   C   **
** 9/11/80     1245     .0     9.4     6.0        0       50        0       77        0       42       **
** 9/11/80     1300     .0     9.6     6.3        0       41        0       64        0       35       **
** 9/11/80     1315     .0    10.2     6.0       27       39       45       65       14       35       **
** 9/11/80     1330     .0    -1.0    -1.0       -1       -1        0        0        0        0   C   **
** 9/11/80     1345     .0    10.3     5.8       36       40       60       67       20       36       **
** 9/11/80     1400     .0    10.5     5.5       30       39       51       67       17       36       **
** 9/11/80     1415     .0    10.2     5.9        5       41        8       68        2       37       **
** 9/11/80     1430     .0    -1.0    -1.0       -1       -1        0        0        0        0   C   **
** 9/11/80     1445     .0     9.9     6.2        0       41        0       66        0       36       **
** 9/11/80     1500     .0     9.9     6.0        0       40        0       65        0       35       **
** 9/11/80     1515     .0     9.9     6.1        8       40       13       65        4       35       **
** 9/11/80     1530     .0    -1.0    -1.0       -1       -1        0        0        0        0   C   **
** 9/11/80     1545     .0    10.2     5.8        5       39        8       65        2       35       **
** 9/11/80     1600     .0    10.5     5.7       95       40      163       68       53       37       **
** 9/11/80     1615     .0    10.6     5.5       18       38       31       66       10       35       **
** 9/11/80     1630     .0    -1.0    -1.0       -1       -1        0        0        0        0   C   **
** 9/11/80     1645     .0     9.9     6.0        0       46        0       74        0       40       **
** 9/11/80     1700     .0    10.2     5.7        1       42        1       70        0       38       **
** 9/11/80     1715     .0    10.0     5.4        0       38        0       62        0       33       **
** 9/11/80     1730     .0    10.2     5.4        5       40        8       66        2       36       **
** 9/11/80     1745     .0    11.0     4.7        0       35        0       63        0       34       **
** 9/11/80     1800     .0    10.9     5.3        1       37        1       66        0       35   B   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
** 0/ 0/ 0        0     .0      .0      .0        0        0        0        0        0        0   *   **
******************************************************************************************************
```

```
     DESCRIPTIVE STATISTICS
     STANDARD     MEAN      HOURLY  MAX.   MIN.   RANGE
     DEVIATION  DEVIATION   MEAN
NO       25.92  -14.10       44.65   69.    22.    46.7
O2        4.28   -2.25        7.27  12.3    2.5     9.8
CO2       4.32   -2.33        7.53  10.4    3.2     7.2
CO      169.70  -24.68       73.33  ****     6.   *****

•FIN
```

```
RUNID: KVB       ACCT: 0130AA32        PROJECT: JRH

RESOURCE UNITS:      TOTAL:           72.724

                    SYSTEM:           72.724
               APPLICATION:            0.000

TIME:    CPU:            30.482       I/O:           1.596
         CC/ER:          13.668       WAIT:          0.000
CORE BLK SECS:         7887.818       AVERAGE SIZE:   94K
IMAGES  READ:    19          PAGES:   59
START:     09:30:46 SEP 23,1980       FIN:  10:30:54 SEP 23,1980
SYSTEM:    32R28-053  A 09/10/79
```

```
******CUSTOMER RECEIPT PAGE******
  RUNID: KVB       ACCT: 0130AA32        PROJECT: JRH

  RESOURCE UNITS:      TOTAL:          72,724

                      SYSTEM:          72,724
                 APPLICATION:           0.000

  TIME:     CPU:            30.482     I/O:           1.596
            CC/ER:          13.668     WAIT:          0.000
  CORE BLK SECS:          7887.818     AVERAGE SIZE:  94K
  IMAGES  READ:   19          PAGES:  59
  START:    09:30:46 SEP 23,1980       FIN:  10:30:54 SEP 23,1980
  SYSTEM:   32R28-053  A 09/10/79
```

```
* * * INFORMATION SYSTEMS DESIGN, INC.  *  3205 CORONADO DR.  *  SANTA CLARA, CA  95051  *  (408) 727+8100  * * *  1108  1X0   * * *

PRINTED BY: KVB              CREATED BY: KVB           FINISHED PRINTING:  9/23/80  10:45:22          ACTUAL PAGES: 62
 USER NAME: KVB                                                   QUEUED:  9/23/80  10:30:56          INPUT DEVICE: ORN
   ACCOUNT: 0130AA32                                             CREATED:  9/23/80  09:30:46            QUEUED TO: ORN
 ON SYSTEM: A                                                  PART NAME: PR#000KVB                     PRINTED ON: ORN
EXEC LEVEL: 32R2B-053                                           PART NO.: 00
 EXEC DATE: 09/10                                              FILE NAME: SYS$*PR#000KVB(1)
```